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Universiti Malaysia Sarawak

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Research for Sustainability

20th Anniversary
1992 - 2012
Faculty of Engineering

EDITORIAL NOTE

"The Faculty of Engineering has seen strong increase in research activities over the last five years..."

Assalamualaikum..

The Faculty of Engineering has seen strong increase in research activities over the last five years. During the same period the number of Post Graduate Students has increased by several folds. The publications in journals and conferences as well as collaboration in research with other universities have also increased proportionally.

The need for the FENG Research Bulletin to evolve over the time, to better represent all this in an attractive and easily readable form, is therefore mandatory. This becomes all the more important as the present issue of the Bulletin is published on the occasion of the 20th Anniversary of the Faculty of Engineering. The editorial team has worked hard in this direction. Several sections have been enhanced, notably the Post Graduate Students section, Research news and Extended abstracts. A feature article has also been added to highlight problems related to the environment and degradation of materials. The overall format of the bulletin has been modified to make it more attractive to the reader.

The editor on behalf of the whole editorial team would like to thank the Faculty for providing support to publish this bulletin and the readers for sparing time to read it.

Prof. Dr Amir Azam Khan
Editor FENG Research Bulletin

FENG RESEARCH BULLETIN TEAM

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Editorial Policy

The FENG Research Bulletin is a publication of the Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS). It publishes current information on Research Activities, Research Publications, Research Findings, Recent Research Equipment, Conferences, Seminars and Research Students of Faculty of Engineering.

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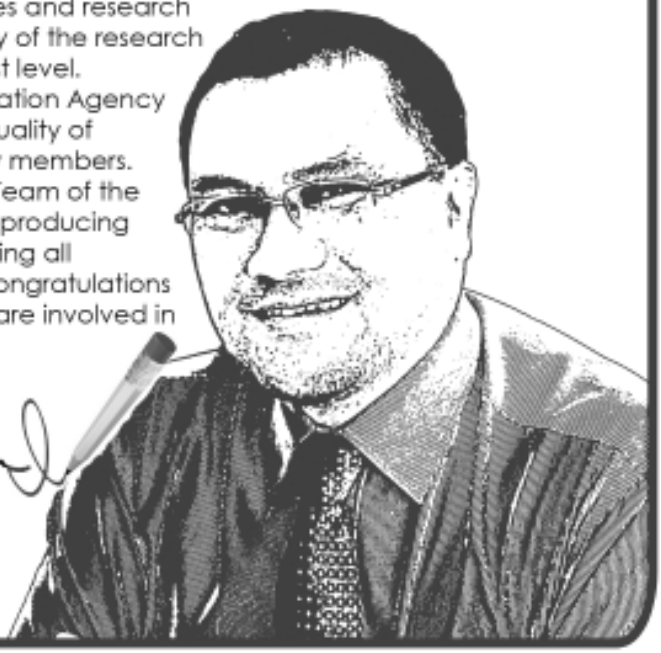
Research News

Students

WHAT THEY SAY.....

Dean

"This year is the 20th anniversary of the Faculty of Engineering. The Faculty has flourished since it was established in 1994 and presently has 115 academic/research staff and 60 supporting staff. The research program at the Faculty has also seen a strong growth over these years where the grants earned by the Faculty have almost tripled from previous years in term of numbers and also research amounts. The research collaboration set up between the Faculty and other universities and research organizations also ensures that the quality of the research conducted at the Faculty is of the highest level.
The recent visit by the Malaysian Qualification Agency (MQA) also highlighted about the high quality of research being carried out by the faculty members.
I would like to congratulate the Editorial Team of the 6th volume of FENG Research Bulletin for producing a document which is worthy of representing all research activities at the Faculty level. Congratulations must also be extended to all those who are involved in conducting research and publishing it."



Prof Dr Wan Hashim Wan Ibrahim

Deputy Dean (Post Graduate and Research)

"The present year has seen an increase in research activities in the Faculty of Engineering. It is also very pleasing to note that the conference budget allocated to the Faculty last year has been fully spent and utilized even before the last quarter of 2013. The number of post-graduate students (both local and foreigners) has also increased in a similar fashion and with this positive trend it is envisioned that publications by staff and students alike will also increase this year. This echoes well with the research culture cultivated in the Faculty and it is my hope that this trend is sustained. This year's FENG Bulletin also reflects an important event that took place last year. This was the organization of the first post-graduate student's colloquium which was organized by the Engineering Post-Graduate Students Association (EPSA). The Faculty's Post Graduate Program was also audited by the Malaysia Qualifications Agency (MQA). it was a very challenging process and at the end of the day, the hard work and perseverance of the staff prevailed. All this would not have been possible without the dedication and support shown by the entire Faculty. Last but not least, I would like to congratulate and thank the editorial team and all those who contributed to this Bulletin. Congratulations and keep up the good work."

Dr Husbairi Zen

Variations on Water Absorption, VPV and Sorptivity Properties at Different Concrete Zones Using Readymixed Concrete

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Abstract
The outer concrete zone in reinforced concrete structure plays very important role in protecting reinforcing steel in all conditions including aggressive environment. The quality of outer concrete zone on durability aspect has to be evaluated through water absorption, volume of permeable void and sorptivity. Hence, an experimental investigation using Ready mixed concrete of grades G30, G40 and G50 produced in Kota Kinabalu, Sabah has been conducted to determine the above properties at different concrete zones using 150mm concrete cubes. The compressive strength has been conducted with companion 100mm cubes. The water curing and site curing have been adopted to observe influence of curing. Based on the short-term study, this investigation concludes that compressive strength increases with age of test. The strength increases of G50 concrete in water cured as much as 10% from 28 to 90 day of age, while the site cured concrete only has 8% strength increments for the same curing period. The concrete grade G30 has the highest water absorption, VPV and sorptivity properties followed by G40 and G50 concrete in all ages of test under both curing conditions. Bottom zone concrete has the lowest water absorption, VPV and sorptivity properties followed by middle and centre zone concrete for all grades. The highest water absorption, VPV and sorptivity are seen at top zone followed by outer (left and right) zone concrete for all grades of concrete. This may be due to lack of richness in concrete consolidation and incomplete hydration. The site cured concrete shows relatively higher water absorption, VPV and sorptivity than water cured concrete. The G50 concrete has shown the lowest properties such as 3% water absorption, 2.5% VPV and 0.19g/mm^2/√t sorptivity even at 28 days.

Keywords: Ready mixed concrete, Different concrete zones, Compressive strength, Water absorption, VPV and Sorptivity

1. Introduction

Reinforced concrete (RC) structures are built at any place with expectation of service life for decades or centuries. However, the deterioration processes limit the service life of RC structures. To ensure durable RC structure, it needs to address environmental condition, freely drain surface, concrete quality and cover, and good workmanship especially curing. In other words, durability of RC structure depends on the selection of optimum materials, proper design, detailing, production and execution. Normal Strength Concrete up to G50 grade is generally used in the local construction without giving importance on durability properties. As stated in BS8110: Part 1, a structure must be provided with adequate concrete cover to make it durable.

Thickness of cover to reinforcement is an important factor controlling the transport of harmful agents especially chloride ions. The greater the cover the longer the time interval before the chloride ion concentration at the surface of the steel reaches the threshold value (Neville, 2002). Insufficient cover to reinforcement has been identified as one of the most significant design parameters responsible for the high prevalence of corrosion of reinforcement.

The actual design of concrete cover is empirical, chosen in function of the structural class and the environment, and its variability is only taken into account with an inclusive term depending on controls in the fabrication process. Standards often specify combinations of cover and strength of concrete such that a lower thickness of cover requires a higher strength of concrete and vice versa. However, thick cover is of no avail if the concrete is highly penetrable. Moreover, large thickness of cover would result in the presence of a considerable volume of concrete devoid of reinforcement. In practical terms, the cover thickness should not exceed 80-100mm but decision on cover forms part of structural design. Too small a thickness of cover should not be used either, because no matter how low the penetrability of the

concrete, cracking or whatever reason can result in a situation where chloride ions can rapidly be transported to the surface of the steel. The outer zone of RC structural member is the home for reinforcing steel, which gives environmental protection and bond strength.

Hence, the objective of this paper is to determine the durability properties such as water absorption, volume of permeable void and sorptivity for this important outer-zone concrete using commonly used concrete grades.

3 Materials and Test Methods

The concrete mixes made by ready mixed concrete company in Kota Kinabalu are shown in Table 1. All materials are available locally. Table 2 shows concrete cube sizes and age on test. Table 3 also shows adopted curing conditions. The relevant tests methods of ASTM and BS are used with modification of test samples as shown in Figure 1 for water absorption, VPV and sorptivity tests.

Table 1: Concrete mix proportions with target slump of 75-125mm

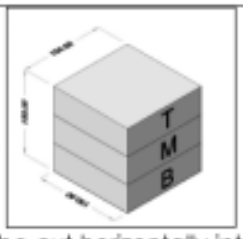
Stone type & source of concrete	Grade	Binder (kg)		Fine aggregate (kg)	Coarse aggregate (kg)		Water (kg)	SP (kg)
		Cement	SF		20mm	10mm		
Sandstone & Ready mixed	G30	400	-	560	1100	70	190	6.68
	G40	460	-	540	1060	90	186	7.682
Granite & Ready mixed	G50	500	30	500	1100	40	184	8.851

Table 2: Concrete cube size and age on test

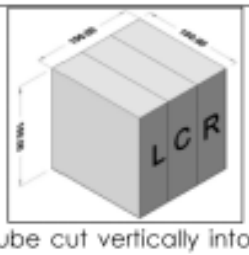
Type of stone & source of concrete	Grade	Test cube size (mm)				Age on test (day)
		Comp. st.	Water absorption	VPV	Sorptivity	
Sandstone & Ready mixed	G30	100	150	150	150	28, 56 & 90
	G40					
Granite & Ready mixed	G50					
Test sample sizes for Water absorption, VPV and Sorptivity	-	-	• Cut three pieces equally in vertically and horizontally prior to test • Mould and cast faces of outer zones, and cut face of inner zones used for sorptivity test			-

Table 3: Adopted curing conditions

Curing type	Curing Symbol	Duration of curing with place (day)			
		Mould	Water	Hessian (water spraying 3 times/day)	Exposed to weather
Water	WC	1	89	-	-
Site	SC	1	-	6	83



(a) 150mm cube cut horizontally into three pieces equally prior to test [Top, Middle and Bottom zones]



(b) 150mm cube cut vertically into three pieces equally prior to test [Left, Center and Right zones]

Figure 1: 150mm cube cut into three zones

4 Results and Discussion

4.1 Compressive Strength

The obtained compressive strengths in this study are shown in Table 4. The average result shown here is based on three test results. Compressive strength is considered as the most important properties as an index of its overall quality (Gambhir, 2004). In this study, specimens from two curing conditions are tested at age of 28, 56 and 90 days. It is believed that specimens cured in water curing condition have

developed higher compressive strength compare to site curing. The strength of the silica fume concrete cured in wet hessian may drop due to lack of supply of moisture. Curing becomes even more important if it contains supplementary cementing materials such as fly ash or silica fume. It has been accepted that curing is more important for concrete with mineral admixtures than for normal concrete (Bentur et al. 1989).

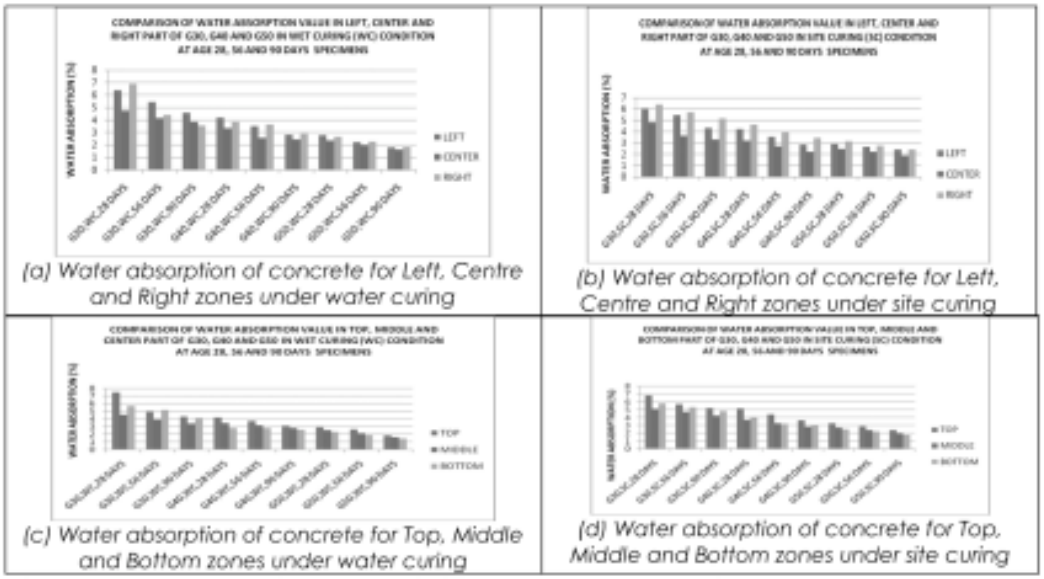
Table 4: Concrete compressive strengths at different ages

Concrete grade	28-day		56-day		90-day	
	Comp. St. (MPa)		Comp. St. (MPa)		Comp. St. (MPa)	
	WC	SC	WC	SC	WC	SC
G30	32.73	30.34	36.65	33.61	40.48	34.78
G40	43.70	41.40	46.61	44.30	48.20	46.92
G50	51.92	50.35	54.11	52.56	57.47	55.07

4.2 Water Absorption

Water absorption is defined as the transport of liquids in porous solid due to surface tension acting in the capillaries. It measures the ease with which water can penetrate into concrete by identifying the capability of the concrete to absorb water. According to Bungey et al. (1996), water absorption for concrete is particularly important on durability aspect. Figure 2 shows water absorption values of different concrete zones for G30, G40 and G50 concretes at 28, 56 and 90 days. The G50 concrete shows the lowest water absorption followed by G40 and G30 concrete in all aspects. The water absorption value decreases with age of test.

Khatib and Mangat (1995) have noticed that the water absorption between the casting face and the bottom face of 150mm concrete cube are different while the water absorption is the same to the side surface of the specimen. During compaction process, the lower density water moves upwards causing the porosity close to the surface greater than in the more compact lower regions. Thus, as expected the water absorption value at top surface of the specimens is greater than those of the bottom surface. While the absorption value at the side surfaces are intermediate between those obtained from the top and bottom surface. Nevertheless, center part of the test specimens also absorbs water tremendously which indicates that the inner side of the concrete is porous and it permit water to flow through the capillaries. Similar to other specimens, the percentage of water absorb in the center part specimens decrease as the concrete age grows no matter the concrete cured in wet or in site condition. Absorption cannot be used as a measure of quality of concrete (Neville, 2002), but generally most good concrete has absorption of less than 10%.



(a) Water absorption of concrete for Left, Centre and Right zones under water curing

(b) Water absorption of concrete for Left, Centre and Right zones under site curing

(c) Water absorption of concrete for Top, Middle and Bottom zones under water curing

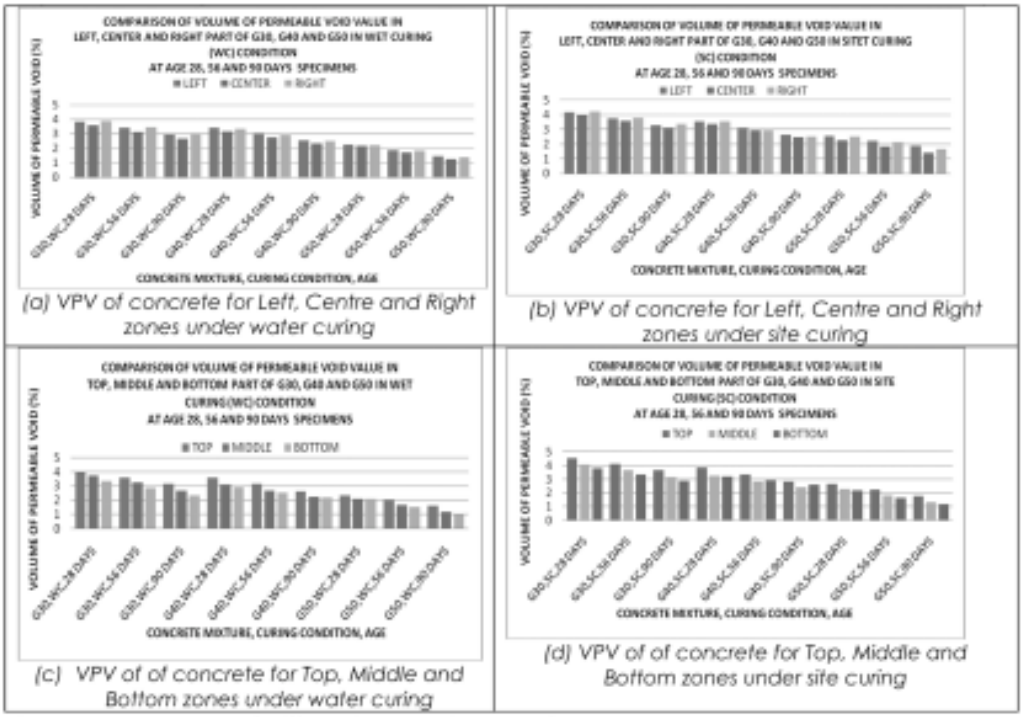
(d) Water absorption of concrete for Top, Middle and Bottom zones under site curing

Figure 2: Water absorption values of different concrete zones for G30, G40 and G50 concretes at 28, 56 and 90 days

4.3 Volume of Permeable Voids (VPV)

Figure 3 shows VPV values of different concrete zones for G30, G40 and G50 concretes at age of 28, 56 and 90 days. The VPV affects the transport mechanisms through the concrete such as ingress of aggressive gases and solutions. The VPV value at top surface of the specimens is greater than those of the bottom surface for all three grades of concrete specimens cured in both conditions.

The VPV values are decreasing as the age of concrete grows. Dinakar et al. (2008) have found that the water absorption is directly proportional to the VPV of concrete. As the water absorption increase, permeable void also increase correspondingly. It is because as the total volume of voids in the concrete increases then the capability of the concrete to absorb water will also increase. In other words, the reduction of porosity at later age will also reduce the concrete penetrability. However, the porosity of the concrete specimens increases with increasing water-binder ratio (Türkmen, 2003). For this reason, it is acceptable for G30 specimens to have the highest value of VPV due to its high water-cement ratio of 0.48 and specimens with silica fume and cured in water curing are expected to have lower VPV since the two contribute in reducing the concrete permeability. As the concrete has longer period of curing, the strength and durability of concrete develop by time. The continuous development of strength will lower the concrete permeability and reduce the occurrence of potential initial cracks due to shrinkage that can reduce the strength, durability and serviceability of the concrete (Türkmen, 2003). Based on the study conducted by Shayan and Xu (2006), the value of VPV in a normal strength concrete is 12-16%. All specimens of G40 and G50 cured for 90 days have lesser VPV compare to specimens that cured for 56 and 28 days. Moreover, specimens cured in water have lower value of VPV than the site cured specimens.



(a) VPV of concrete for Left, Centre and Right zones under water curing

(b) VPV of concrete for Left, Centre and Right zones under site curing

(c) VPV of of concrete for Top, Middle and Bottom zones under water curing

(d) VPV of of concrete for Top, Middle and Bottom zones under site curing

Figure 3: VPV values of different concrete zones for G30, G40 and G50 concretes at 28, 56 and 90 days

4.4 Sorptivity

Sorptivity is meant as rate of movement of a wetting front through a porous material under the action of capillary force. Generally, water sorptivity is a property describing the rate of water penetrating into the concrete due to capillary action. Good quality of concrete shows low sorptivity rate. Sorptivity test gives an indication of the possibility for the penetration of harmful materials like chloride and sulfate ions which can lead to deterioration in concrete structures.

Figure 4 shows sorptivity values of different zones for G30, G40 and G50 concretes at 28, 56 and 90 days. As expected the sorptivity decrease as the concrete goes with long duration of hydration. This is due to reduction in the pore diameter as the concrete hydrates with age. The sorptivity value is relatively high at age of 28 days compare to later ages. Top zone concrete shows the highest sorptivity in all grades of concrete.

Increasing water-cement ratio would result in the decreasing of compressive strength and increasing the capillary coefficient. Increasing capillary coefficient would result an increase of appearing porosity. Therefore, as expected G30 concrete specimens would have higher water absorption, VPV and sorptivity value compares to the G40 and G50 concrete specimens.

As for G40 concrete, the sorption rate is slightly higher than G50 and lower than G30 concretes. The penetration pattern however is similar to the G50 specimens. The porosity in concrete may be influenced by properties of coarse aggregate. Winslow and Liu (1990) have found that, the presence of coarse aggregates results an increased porosity. However, porosity of cover concrete and effect of curing on capillary size can be accessed through this test. The G30 concrete shows the highest sorptivity values in this study.

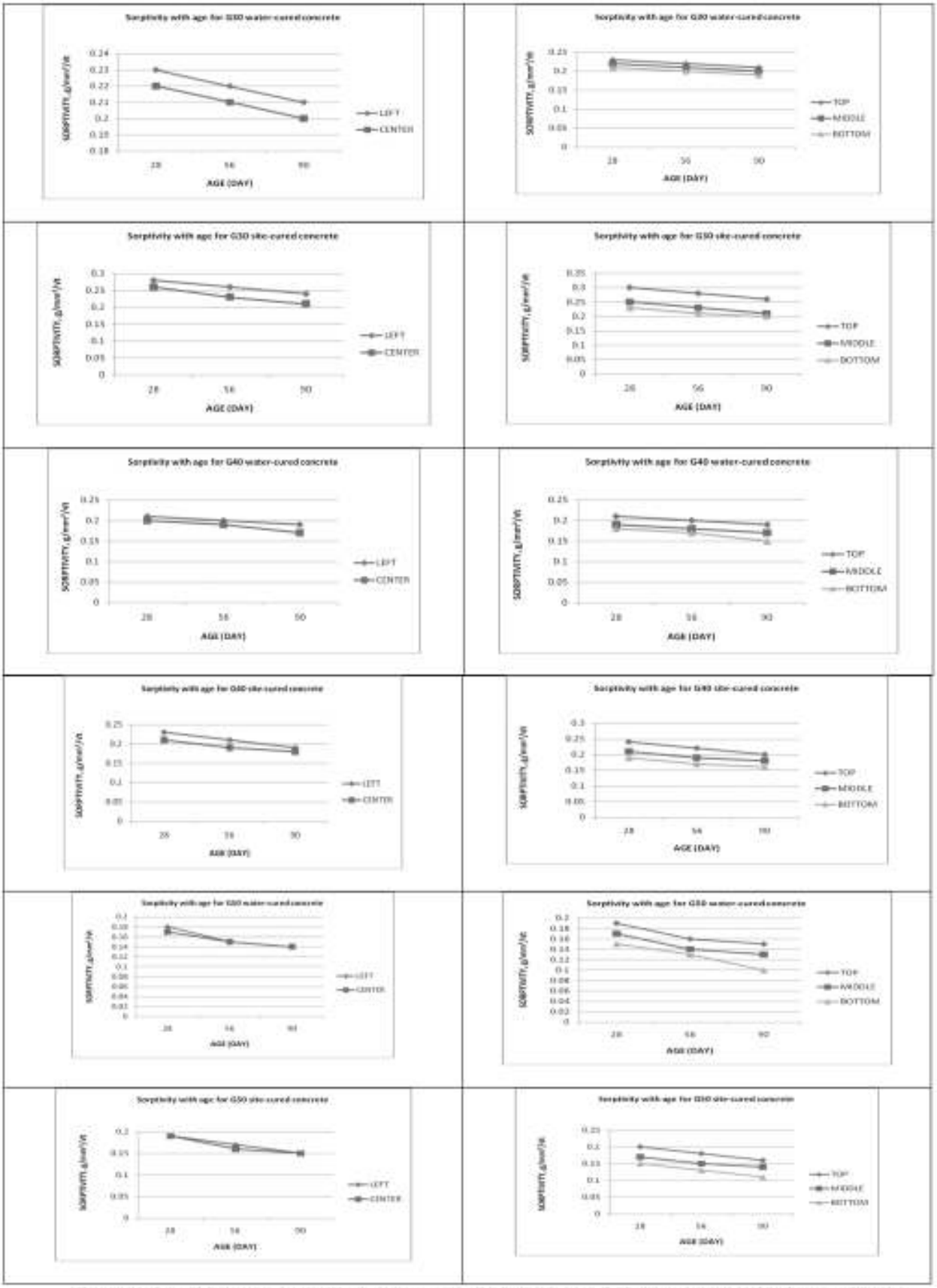


Figure 4: Sorptivity values of different zones for G30, G40 and G50 concretes at 28, 56 and 90 days

5. Conclusions

Based on the short-term study, following conclusions are drawn.

1. The compressive strength increases with age of test. The strength increases of G50 concrete in water cured as much as 10% from 28 to 90 day of age, while the site cured concrete only has 8% strength increments for the same curing period.

2. The concrete grade G30 has the highest water absorption, VPV and sorptivity properties followed by G40 and G50 concrete in all ages of test.
3. Bottom zone concrete has the lowest water absorption, VPV and sorptivity properties followed by middle zone and centre zone concrete for all grades.
4. The highest water absorption, VPV and sorptivity are seen at top zone followed by outer (left and right) zone concrete for all grades of concrete. This may be due to lack of richness in concrete consolidation and incomplete hydration.
5. The site cured concrete shows relatively higher water absorption, VPV and sorptivity than water cured concrete.
6. The G50 concrete has shown the lowest values such as 3% water absorption, 2.5% VPV and 0.19g/mm^2/√t sorptivity even at 28 days.

6. Future Study

Existing RC structures in Malaysian coastal area are built using conventional Prescription-based concrete specifications. The service life is affected very much in the form of concrete crack, spalling of cover concrete and reinforcement corrosion which are seen even within 5 years after construction. RC structures exposed to tropical climate are more prone to chloride attack as tropical climate is better for chloride ions to move into concrete due to high relative humidity, temperature and chloride concentration. Generally, barriers to durability of RC structures in coastal area are due to (1) lack of practice with durability requirement, (2) use of marginal or inferior quality aggregates, (3) structures built in high humidity and airborne chloride belt, and (4) ignoring curing practice in construction.

At present in local construction practice, prescription-based concrete specification is followed which deals with concrete mix in terms of ingredients and their proportions. In durability-based (also known as performance-based) specification, which is similar in concept with Outcome Based Education (OBE), the end is verified in terms of measured concrete properties, either at truck chute, or cast in-place. To address this urgent issue on durability, it is recommended to investigate the local ready mixed concrete in order to develop durability-based concrete specifications for local construction industry. The frameworks are Durability index (DI) approach, review of DI test methods and service life models and, Implementation of durability-based design and specification.

Acknowledgement

The author is thankful to the Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS), and Universiti Malaysia Sabah (UMS) for successful completion of this work.

References

1. Bentur, A., Goldman, A. 1989. A curing effects, strength and physical property of high strength silica fume concretes. J Mater Civ Eng ASCE 1989; 1(1):46-58
2. Bungey, J.H. and Millard, S.G., 1996. Testing of Concrete in Structures, Third edition, Blackie Academic & Professional.
3. Dinakar, P., Babu, K.G. & Santhanam, M., 2008. Durability properties of high volume fly ash self compacting concretes. Cement & Concrete Composites, 30, pp. 880–886
4. Gambhir, M.L., 2004. Concrete Technology, Third edition, New Delhi, India: Tata McGraw-Hill Publication
5. Khatib, J.M.; Mangat, P.S. 1995, Absorption characteristics of concrete as a function of location relative to casting position, Cement and Concrete Research, Volume 25, Number 5, July 1995, pp. 999-1010(12
6. Neville, A.M. 2002. Properties of Concrete, Fourth and Final Edition Standards updated to 2002. Prentice Hall.
7. Shayan, A. and Xu, A. 2006, Performance of glass powder as a pozzolanic material in concrete: a field trial on concrete slabs, Cement and Concrete Research 36 (2006) 457–468
8. Türkmen, I. 2003. Influence of different curing conditions on the physical and mechanical properties of concretes with admixtures of silica fume and blast furnace slag.
9. Winslow, D. and Liu, D. 1990. The pore structure of paste in concrete, Cement and Concrete Research, 20, No.2, pp. 227-84 (1990)

Modelling of Energy Extraction From Low Velocity Water Stream with Micro Hydro Turbine

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This research aims to model blade for Micro Hydro Turbines (MHT) which will be suitable to operate and able to extract energy from water velocity ranges from 0.25m/s to 1.0 m/s. Various types of MHT are available and generally all are operated at water velocity more than 1 m/s. However, the major percentage of river basins generally, Malaysia and particularly, Sarawak are having the stream velocity which is less than 1 m/s. The traditional MHT is not suitable at water velocity less than 1 m/s. Ultimately, people living in those areas with water velocity less than 1 m/s have no choice. Therefore, there is a need to understand and modelled such flows moving over the blades. The modelling is based on using the Nevier-Stokes (NS) as governing equation applicable to the water flow over the blades. The vital parameters which will be the part of the semi-empirical model equation involved in the modelling are blade area, blade angle against water flow direction, spacing between blades, blades materials and turbine size, and other relevant factors.

It was found that MHT suitable for low-velocity water is not available in the market and the fact is that a major percentage of people in rural area living nearby water stream having velocity less than 1.0 m/s. This implies that those people living in low velocity water area cannot use existing and readily available MHT. The focus of this research project is to develop a MHT suitable to operate at water velocities between 0.2 m/s to 1.0 m/s. Practice shows that development of a successful product has at least three stages such as fundamental research for developing model, prototype development and finally commercialization. Since this research project is completely new and based on a fundamental concept, it has to start from the fundamental research stage by studying an indispensable part of MHT which is the turbine blade (runner) design.

The research question, therefore, becomes: What are the optimized dimensions for the turbine blade (runner) suitable to maximize the energy extraction from low-velocity water (0.2 m/s to 1.0 m/s)? As low-velocity MHT is not available in the market and there is no evidence of this in literature; particularly the blade design for low-velocity water turbine, on this background, this research for developing blade (runner) at low-velocity water (0.2 m/s to 1.0 m/s) is the only likely solution to proceedl. Thus, this project works towards generating new concepts towards extracting kinetic energy from low water velocity.

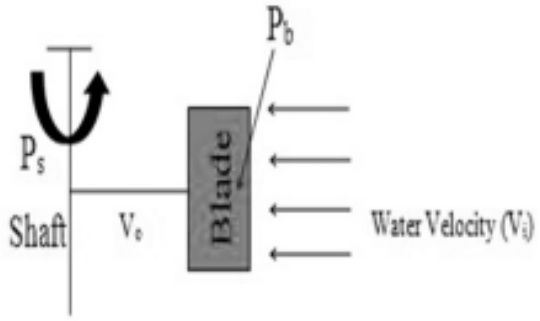

Figure 1: Mechanism of extraction and transmission. Here, Pb – Energy Blade, Ps – Shaft Power

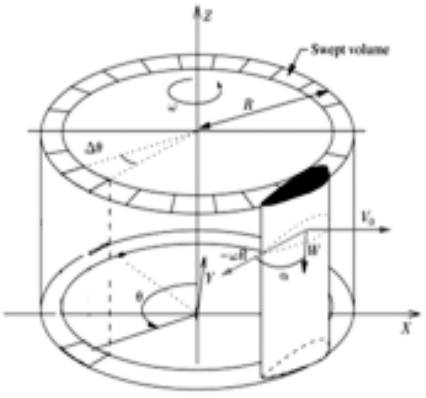

Figure 2: Turbine blade assembly

Investigation on Lateral Movement of Piles in Sarawak Soft Riverbank

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Sarawak is a state of many rivers and most of the town centres, settlements, villages, rural schools and clinics are situated along these river banks. Hence, most of the road alignment designs are crossing rivers where landing facilities, wharves, jetties, ferry ramps are built along the river banks to enable safe movement of goods and passengers. Unfortunately in Sarawak, most of the river banks are approaching limiting stability due to the existence of soft soil of sedimentary origin (high content of silt). Furthermore, the high tidal fluctuation between 4 to 6 meters may also be contributory to the instability of the river bank. Therefore, technical department such as Public Work Department (PWD) of Sarawak is facing great challenges to overcome this geotechnical problem.

In many cases, piles are not designed to resist the lateral soil movement, unless the piles are designed to stabilize unstable slopes or potential landslides. Designers, in general, design piles in the river bank only to take up the vertical load and this may be due to slope in the riverbank is stable when performing preliminary slope analysis or simply due to inexperienced designers. When the river bank is approaching the limiting stability in its natural state, any construction activity on the river bank or scouring in front of the riverine structure or high tidal fluctuation may result in lateral soil movement and this movement will induce bending moments and deflections in the pile. When the lateral soil movement is larger than the pile's capacity in restraining the lateral movement, the pile will be damaged and cause the structure to be in distress or failure. On the other hand, some conservative designers tend to over design piles in the riverbank to restrain the lateral movement, which is uneconomical.

It is the intention of researchers and practitioners from both UNIMAS and PWD of Sarawak to study the behavior of piles in the riverine structure in a complete field instrumentation of both testing and working piles. Computer modeling shall also be performed and these models are to be benchmarked against the data obtained from field instrumented data. Parametric studies can then be performed to create simplified design charts for the design of piles subject to riverbank induced lateral soil movement. This project is a collaborative research work between UNIMAS and PWD Sarawak in solving one of the many geotechnical associated problems in the state. A registered PhD. Student, a staff in PWD, is involved in ensuring the success of the project.

Figure shows the "remains" of collapsed reinforced concrete wharves on Sg. Saribas (Pusa) and Batang Lupar (Lingga) river banks. It is thought that large fluctuating river water levels and river bank erosion cause structural distress to the supporting piles that subsequently resulted in the collapse.

Mapping of Tidal Energy for Sabah and Sarawak

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Green energy sources are infinite, environment and nature friendly and produce less emission as compared to fossil fuels. The tidal energy resources are one of the most predictable and reliable green energy sources. The tidal energy depends only on the gravitational pull of the moon and the sun and the centrifugal forces created by the rotation of the earth-moon system. Due to these gravitational pulls, water levels follow periodic highs and lows and produce tidal currents or streams. Thus, the energy can be produced either through construction of a barrage over estuaries or using kinetic energy of tidal stream by installation of tidal in-stream turbines and generators.

Tidal barrage is usually a dam or offshore impoundment used to block the incoming and outgoing tides and then create a water head. The potential energy of water head in the barrage facilitates to produce power from different tidal conditions. In tidal stream technology, the turbines are installed underwater at the locations in the sea where the high tidal stream exist (Rigit et al., 2013). Tidal stream turbines make use of the kinetic energy of the tidal stream to power turbines, in a similar manner to the way in which windmills extract energy from the wind.

Tidal stream method is gaining popularity because of the lower cost and lower environmental impact compared to tidal barrage method. This technology is less intrusive than tidal barrages and the installation and maintenance methods of tidal streams are simpler than barrage. The construction of barrages over estuaries has some environmental and ecological impacts (Jakhrani et al., 2013). The change in water level and possible flooding would affect the ecosystems along the coast. The water quality in the basin would also be affected, and the turbidity may affect the animals that live in the water. In addition, the installation of tidal stream structure could change the tidal flow patterns in hydrodynamic regimes.

The cost of building tidal streams turbine electricity generator will be very site specific and will depend on the technology used. However, once installed, the maintenance costs will be the only main cost during the life of the project. Tidal stream is the periodic horizontal flow of water associated with the rise and fall of the tide. This horizontal flow of water stores an enormous amount of energy that can be extracted and used for the purpose of power generation. The tidal stream technologies are more attractive than windmills due to more accurate predictability of tidal streams and the higher water density as compared to air. However, it is not a mature technology to be used as large scale electricity generation.

In order to predict the extent and nature of ecological consequences there is a need for greater understanding of the distribution and level of the tidal energy resource. In this study, the availability of tidal stream energy potential in the coastal zone of Sabah and Sarawak was estimated (Figures 1 and 2).

Figure 1: Types of tides around Sarawak coastline.

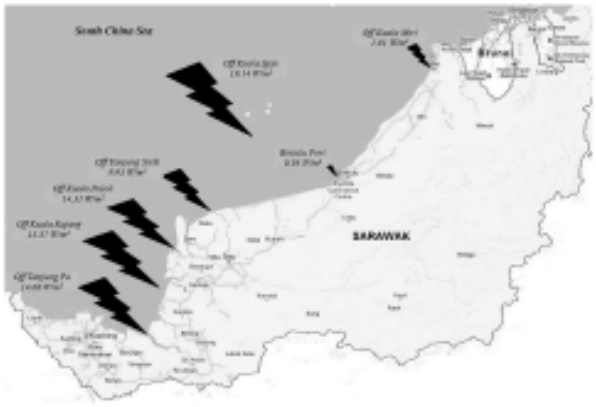

Figure 2: Extractable annual power density at various locations in Sarawak coastline.

Automated Sorting System with Image Processing for Colony Enumeration System

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Enumeration of biological cells is an essential process to count the number of cells in the life sciences discipline. There are multiple parameters to consider during enumeration such as concentration and viability, but the simplest and the cheapest method of cell enumeration is through serial dilutions and counting colony-forming units (CFU) from culture plates. The downside of this approach is the process of counting colonies from hundreds of culture plates is very labor-intensive and time consuming, which could hinder the pace of the research.

An intelligent, automated and low-cost system for handling and enumerating the CFU from culture plates should be developed. Automated handling systems employ a detection system provides significant improvements in term of efficiency and consistency in the colony detection process. Moreover, the development of the specialized system for specimen sorting would facilitate in labor and time reduction while providing error-free data.

This study focuses on the design and development of an automated colony enumeration system comprising culture plate handling and colony detection by image processing. Figure 1 shows the schematic diagram of the system. The system alone will be capable of processing a minimum 2000 specimen plates in a day based on a 24-hour operating scheme while requiring very little human intervention. Moreover, in this study, software such as MATLAB will be used in the first stage of image processing while a non-compiled software will be developed on a standard PC. In this configuration, it is possible to perform the whole procedure of shape analysis method for the identification of the specimens. Sequentially, the development and application of the automated system will solve the problems related to the application of the manual sorting method such as difficulties in handling specimen in laboratories at many universities.

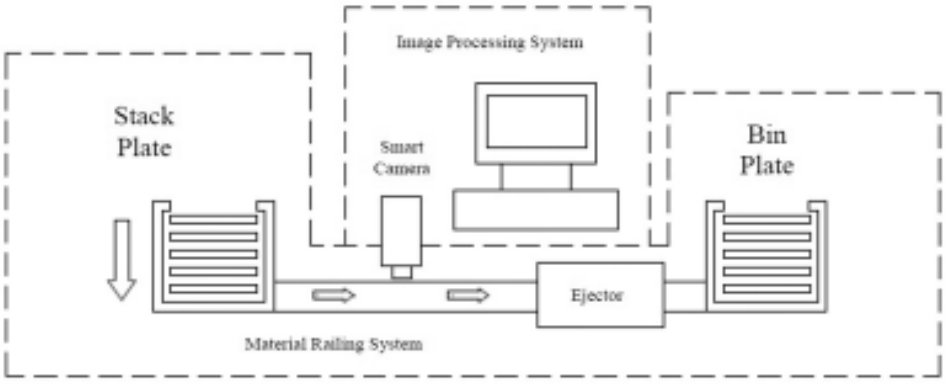

Figure 1: Schematic diagram of the automated sorting system

Research Grants

Dana Principal Investigator (DPI), UNIMAS					
No.	**Principal Researcher**	**Co-researchers**	**Title**	**Funding Period (months)**	**Fund Amount (RM)**
DPI (08)	Prof. Dr. Amir Azam Khan	Prof. Dr. Sinin Hamdan, Prof. Dr. Ir. Andrew Ragai Henry Rigit	Synthesis of Ceramic Nano Powders through Sol Gel Process, Study of Morphology and Composition changes with Post Treatment	24	54,000
DPI(15)	Prof. Madya Dr. Wan Azlan bin Wan Zainal Abidin	Prof. Madya Dr. Al-Khalid Othman, Dr. Hushairi Zen, Dr. Thelaha bin Masri, Dr. Kismet anak Hong Ping	GPS/Network-based Radial Basis Funtion Prediction Method for Real-time Heavy Vehicle Monitoring	24	50,000
DPI(19)	Prof. Madya Dr. Siti Noor Linda bt. Hj. Taib	Prof. Dr. Shenbaga Rajaratnam Kaniraj Jeyachandran, Ahmad Kamal b. Abd. Aziz, Ir. Lee Lin Jye	Investigation on Lateral of Piles in Sarawak Soft Riverbank	24	50,000
DPI(23)	Prof. Madya Dr. Khairuddin Sanaullah	Dr. Lim Soh Fong, Prof. Ir. Dr. Mohd Sobri Takriff, Dr Hushairi Zen, Afrasyab Khan	Modeling/CFD Validation of Direct Contact Condensation of Supersonic Steam with Subcooled water	24	50,000

Exploratory Research Grant Scheme (ERGS), Ministry of Higher Education					
No.	**Principal Researcher**	**Co-researchers**	**Title**	**Funding Period (months)**	**Fund Amount (RM)**
ERGS/02(01)/807/2011(02)	Dr. Tay Kai Meng	Prof. Dr. Ng Chee Khoon, Prof. Dr. Lim Chee Peng (USM), Dr Neoh Siew Chin (UNIMAP), Siti Noor Ain Musa, Nordiana Rajaee	Development of a novel Tpye 2- Fuzzy Logic Based-Group Decision Support Model For The local (Sarawak) Food Industry	24	94,000
ERGS/02(02)/853/2012(05)	Prof. Ir. Dr. Andrew Ragai Henry Rigit	Jane Labadin, Prof. Madya Dr. Azhaili Baharun	Mapping of Tidal energy for Sarawak and Sabah	24	50,000
ERGS/02(07)/859/2012(11)	Prof. Dr. Ng Chee khoon	Dr Tay Kai Meng, Mdm Chiew Fei Ha (UiTM), Dr. Delsye Teo Ching Lee	Development of a Novel Musical-inspired Meta-heuristic Optimiser for Mix Proportion Design of High-Strength Concrete	36	50,000
ERGS/02(08)/860/2012(12)	Dr. Md Rezaur Rahman	Prof. Dr. Sinin Hamdan, Prof. Madya Dr Abu Saleh, Dr. Rubiyah Baini, Dr. Dyg Maryani Awg Hashim, Mohd Farid Atan	Synthesis and Characterization of Mn3O4 nanoparticles and its application on Oxidative and antibacterial activity	36	50,000

ERGS/1/2013/T/K01/UNIMAS/02/01	Dr. Abdullah Yassin	Prof. Madya Dr M. Shahidul Islam, Dr. Syed Tarmizi Syed Shazali, Mohd Azrin Mohd Said	A Novel Method in Measuring Cutting Edge Temperature of End Mill Tool in High Speed Machining using Infrared Radiation	24	132,000
ERGS/1/2013/T/K03/UNIMAS/02/01	Dr. Onni Suhaiza Selaman	Prof. Madya Nasser Rostam Afshar, Prof. Madya Dr Siti Noor Linda, Dr. Darrien Mah Yai Seng, Dr. Magdalene Andrew Munot, Dygku Salma Awg Ismail, Dr. Ena Kartina Abdul Rahman (Institut Teknologi, Brunei)	Design and Efficiency of a New Approach to Water DrainageSystem in Slope	24	80,000
ERGS/1/2013/T/K04/UNIMAS/03/01	Norazelina Bateni	Prof. Dr. Md Abdul Mannan, Prof. Dr. Ng Chee Khoon, Prof. Dr FJ Putuhena, Prof. Madya Ir. Dr. Resdiansyah Mansyur, Dr. Onni Suhaiza, Dr. Darrien Mah Yau Seng, Dr. Delsye Teo Ching Lee, Ron Aldrino Chan @ Ron BUking	Performance of Micro-Detention Pond using Honeycomb Structure for Green Pavement in Housing Area	24	135,000
ERGS/1/2013/T/K04/UNIMAS/02/01	Norsuzailina Mohamed Sutan	Prof. Dr. Sinin Hamdan, Dr. Delsye Teo Ching Lee, Ibrahim Yakub, Dato' Ir. Dr. Mohd Salleh Jaafar (UPM, Dr. Zainal Abidin Talib (UPM)	Development of Durable Eco-Friendly Modified Multicomponent Binder (MMCB) Cement System Containing Ground Spenf Fluidized Catalytic Cracking Unit (GSFCCU)	24	132,000

Fundamental Research Grant Scheme (FRGS), Ministry of Higher Education					
No.	**Principal Researcher**	**Co-researchers**	**Title**	**Funding Period (months)**	**Fund Amount (RM)**
FRGS/03(06)/803/2011(72)	Prof. Madya Dr. Hj Mohammad Omar Abdullah	Tay Kai Meng, Dr. Shanti Faridah Saleh, Hussain H. Al-Kayiem (Universiti Teknologi Petronas)	Inteligent Performance Optimization Framework For Collaborative Hybrid Energy System (I-Porches) : Theoretical Development, Mathematical Formulation and Laboratory Verfications.	36	175,200
FRGS/03(07)/839/2012(79)	Norsuzailina Mohamed Sutan	Prof. Dr. Sinin bin Hamdan, Dr. Delsye Teo Ching Lee, Dr. Zainal Abidin Talib (UPM), Dr. Ir. Mohd Saleh Jaafar(UPM)	Parametric study on Utilizing Waste Glass as a Finely Ground Mineral Adictive (FGMA) in a Modified Multi-Component Binder (MMCB) Durable Eco-friendly Cement System	24	60,750

FRGS/TK04 (01)/972 /2013 (13)	Dr. Delsye Teo Ching Lee	Prof. Ng Chee Khoon, Prof. MD Abdul Mannan, Prof. Hilmi bin Mahmud (Universiti Malaya), Norsuzailina bt Mohamed Sutan	Chloride Penetration and Time to Corrosion Initiation of Concrete Produced from Agricultural Waste	36	73,000
FRGS/TK01 (01)/973 /2013 (14)	Dr. Syed Tarmizi Syed Shazali	Prof. Madya Dr. Shahidul Islam, Dr. Abdullah Yassin, Hishammudin Afifi, Ahmad Adzlan Fadzli, Mohd Azrin Mohd Said	Modelling of Energy Extraction From Low Velocity Water Stream with Micro Hydro Turbine	36	128,000
FRGS/ICT 02(01)/99 7/2013 (38)	Dr. Tay Kai Meng	Prof. Dr. Lim Chee Peng, Dr Mah Yau Seng, Asrani Bin Lit, Dr Delsye Teo Ching Lee, I.R. Ting Sim Nee	A Novel Theoretical Synthesis of Fuzzy Causal Modeling and Information Theory: Mathematical Extensions, Evaluations, and a Real World Application in Sarawak	36	68,900
FRGS/2/ 2013/TK07/ UNIMAS/ 02/1	Prof. Madya Dr. Siti Noor Linda	Nursuzailina binti Mohamed Sutan, Ibrahim bin Yakub, Ron Aldrino Chan @Ron Buking, Notazzlina M. Sa'don, Prof. Fauziah bt. Ahmad	Strength, Morphological and Chemical Characterizations of Pavement Subbase Modified by Chemical and Industrial Waste for Durable Road Construction.	36	75,000
FRGS/2/ 2013/TK01/ UNIMAS/ 02/2	Dr. Mohd Danial Ibrahim	Prof. Madya Dr. Miyanaga Norifumi, Dr. Nabilah Ibrahim, Muhd Fadzli Ashari	Investigation of Non-Newtonian and Multiphase Laminar-Turbulent Flow Regime Rheology of Modified Nano-Macro Boundary Surfaces	24	96,850
FRGS/2/ 2013/TK03/ UNIMAS/ 03/1	Ir. David Bong Boon Liang	Prof. Ir. Dr. Andrew Rigit, Dr. Tay Kai Meng, Dr. Khoo Bee Ee	Tuning-Free Spatial Descriptor Model For Image Quality Perception	24	51,000
FRGS/2/ 2013/TK04/ UNIMAS/ 03/1	Dr. Nicholas Kuan Hoo Tien	Prof. Dr. Amir Azam Khan	An investigation of the analytical tensile model and mathematical impact response formula for the novel lightweight eco-friendly Pandanus atrocapus based composite	36	74,500
FRGS/2/ 2013/TK04/ UNIMAS/ 02/1	Dr. Siti Kudnie Sahari	Dr. Rohana binti Sapawi, Norsuzailina binti Mohamed Sutan, Prof. Dato Dr. Burhannudin Yeop Majlis, Prof. Dr. Ibrahim bin Ahmed, Assoc. Prof. Dr. Azrul Azlan Hamzah	Theoretical Formulation of Interfacial Layer Growth between High-k and Germanium Surface	24	81,000

FRGS/2/2013/SG02/UNIMAS/01/1	Prof. Dr. Sinin Hamdan	Prof. Madya Dr. Hasnizam Abdul Wahid, Prof. Madya Dr. Ismail Jusoh	Sound Quality Assessment of Wood	36	112,000

Prototype Research Grant Scheme (PRGS), Ministry of Higher Education					
No.	**Principal Researcher**	**Co-researchers**	**Title**	**Funding Period (months)**	**Fund Amount (RM)**
PRGS/02(02)/829/2011(02)	Prof. Madya Dr. Mohammad Omar Abdullah	Dr. Ivy Tan Ai Wei Dr. Leo Sing Lim (ICATS)	Bio-Chemical Adsorption Compressor (MY - 143033 - A) Upgrading For Automobile Air-Conditioning Real Qworld Application	24	240,000

Research Acculturation Grant Scheme (RAGS), Ministry of Higher Education					
No.	**Principal Researcher**	**Co-researchers**	**Title**	**Funding Period (months)**	**Fund Amount (RM)**
RAGS/TK/01(1)/934/2012 (35)	Noor Aliah Abdul Majid	Prof. Madya Ir. Dr. Mohd Shahril Osman, Mohd Fareez Edzuan bin Abdullah, Mohd Syahmi Jamaludin	Real-Time Physical Properties Measurement to Determine the Quality of Roasted Coffee Bean	24	20,000
RAGS/TK/01(2)/935/2012 (36)	Muhammad Fadzli Ashari	Prof. Madya Dr. Awang Ahmad Sallehin bin Awang Husaini, Prof. Madya Ir. Dr. Mohd Shahril Osman, Dr. Azham Zulkhamain, Dr. Mohd Danial Ibrahim, Ahmad Adzlan Fadzli Bin Khairi, Mohd Syahmi Bin Jamaludin	Accelerated Production of White Pepper Using Integrated Mechanical and Enzymatic Solutions in an Automated Machine	24	20,000
RAGS/TK/03(1)/939/2012 (40)	Dr. Leonard Lim Lik Pueh	Prof. Kaniraj Shenbaga, Nor Azalina Rosli	Heavy Metal Contaminated Soil Remediation Using Electrokinetics from Prevention of Groundwater Contamination	24	20,000
RAGS/TK/05(3)/942/2012 (43)	Khairul Anwar Mohamad Said	Nur Syuhada Ahmad Zauzi, Ibrahim Bin Yakub, Mohamed Afizal Bin Mohamed Amin, Prof. Madya Dr. Hj. Mohammad Omar Abdullah	Characterization of Antioxidant and Phenolic Compound Extracted from Ripen Banana (Musa sp.) Using Ultrasonic Assisted Extraction	24	20,000
RAGS/TK/05(2)/941/2012 (42)	Dr. Ivy Tan Ai Wei	Nur Syuhada Ahmad Zauzi, Ibrahim Bin Yakub, Mohamed Afizal Bin Mohamed Amin, Khairul Anwar	Feasibility Study of Phytoremediation Towards Sustainable Palm Oil Mill Effluent (POME) Treatment	24	20,000

RAGS/TK/01(4)/937/2012 (38)	Dr. Mohd Danial Ibrahim	Prof Madya Miyanaga Norifumi (Waseda University, Japan), Prof. Madya Ir. Dr. Mohd Shahril Osman	Theoretical Development and Experimental Verifications of a Smart and Energy Efficient Hard Disk Drives	24	25,000
RAGS/TK/01(5)/938/2012 (39)	Ahmad Adzlan Fadzli bin Khairi	Prof. Madya Ir. Dr. Mohammad Shahril Bin Osman, Dr. Mohd Danial Bin Ibrahim, Dr. Azham Bin Zulkarnain, Hishammudin Afifi Bin Huspi, Muhamad Fadzli Bin Ashari	Achieving Desired Operational Condition for Devices Interacting with Fluid Flow Through Exploitation of Dimples and Rivets	24	25,000
RAGS/TK/05(1)/940/2012 (41)	Ibrahim Yakub	Prof. Madya Dr. Zurina Zainal Abidin (UPM), Nur Syuhada Ahmad Zauzi, Norsuzailina Mohamed Sutan, Khairul Anwar Mohd Said, Mohamed Afizal Mohamed Amin	Study of the Effects of Intrinsic Metal Content on the Characteristics of Bimetallic Impregnated Catalyst Over Porous Carbon for Selective Catalytic Reduction (SCR)	24	20,000
RAGS/TK/01(3)/936/2012 (37)	Mohd Azrin Mohd Said	Prof. Madya Ir. Dr. Mohd Shahril Osman, Dr. Abdullah Yassin, Prof. Madya Dr. Abu Saleh Ahmed, Ibrahim Yakub, Mohd Fareez Edzuan Abdullah, Hishammudin Afifi Huspi	Study and Design of Lab Scale Algae Production-Harvesting Integrated System in Improving Algae Oil Production	24	20,000
RAGS/TK/07(1)/945/2012 (46)	Mohd Fareez Edzuan bin Abdullah	Prof. Madya Ir. Dr. Mohd Shahril Osman, Noor Aliah Abdul Majid, Mohd Azrin Mohd Said, Hishammudin Afifi Huspi	Study of Biofuel Oxygen Content Effects on Diesel Exhaust Emission	24	20,000
RAGS/TK/07(3)/947/2012 (48)	Nur Syuhada Ahmad Zauzi	Dr. Rubiyah Hj Baini, Prof. Madya Dr. Omar Abdullah, Ibrahim Yakub, Mohamed Afizal Mohamed Amin, Khairul Anwar b Mohd Said	Study on the Chemical Treatment of Red Mud as Catalyst for the Conversion of Plastic Waste to Fuel	24	20,000
RAGS/TK/07(2)/946/2012 (47)	Mohamed Afizal Mohamed Amin	Prof. Madya Dr. Omar Bin Abdullah, Khairul Anwar Mohd Said, Ibrahim Bin Yakub, Nur Syuhada Bt. Zauzi	Characterization and Optimization of Proton Exchange Membrane Based on Speek/Chitosan Material for Fuel Cell Application	24	20,000
RAGS/TK01(1)/1050/2013 (17)	Annisa binti Jamali	Prof. Madya Dr. Mohd Omar Abdullah, Ervina Junaidi, Noor Aliah Abdul Majid, Dr. Helmy B Hazmi, Mohd Fareez Edzuan b Abdullah, Mohd Syahmi b Jamaluddin	Parametric Study on Rehabilitiation Robot of Upper Limb Impairment for Domestic Setting	24	65,000

RAGS/TK02 (1)/1051 /2013 (18)	Abdul Hafiz Abdul Karim	Muhammad Fadzli Ashari, Dr. Azham Zulkhamain, Dr. Shafrida Sahrani	Automated Sorting System with Image Processing for Colony Enumeration System	24	51,900
RAGS/TK04 (1)/1052 /2013 (19)	Mohd Syahmi Jamaluddin	Prof. Dr. Amir Azam Khan, Dr. Azham Zulkhamain, Noor Aliah Abdul Majid, Mohd Fareez Edzuan bin Abdullah, Anissa Jamali	Mechanical Properties of Novel Hot Press Glycidyl Methacrylate/Sago Biomass Biocomposite	24	51,000

Small Grant Scheme (SGS), UNIMAS

No.	Principal Researcher	Co-researchers	Title	Funding Period (months)	Fund Amount (RM)
02(S105)/ 877/2012 (18)	Asrani Hj Lit	Dr. Kismet Hong Ping, Dr. Nordiana Rajaee, Sharifah Masniah Wan Masra, Hazrul Mohamed Basri	Development of Network Patitioning (NP) and Core Clustering in Network-on-Chip (NoC)	12	5,000
03(S113)/ 894/2012 (26)	Ibrahim Yakub	Dr. Rezaur Rahman, Norsuzailina Mohamed Sutan	Physicochemical Characterization of Ultra-Fine Amorphous Colloidal Silica Modified Binary Binders.	12	10,000
02(S115)/ 897/2012 (28)	Annisa bt. Jamali	Prof. Madya Ir. Dr. Mohd Shahril Osman, Mohd Syahmi B. Jamaludin, Muhd Fadzli Ashari, Ervina Junaidi	Control Algorithm for Hyper Redundant Robot in Constraint Area	12	8,360
02(S120)/ 952/2013 (04)	Dr. Siti Kudnie Sahari	Norsuzailina bt. Mohamed Sutan, Ibrahim bin Yakub	Germanium Oxide Growth in Dry Oxygen Ambience	12	9,996

OSAKA GAS Projects, 2013

No.	Principal Researcher	Co-Researchers	Title	Funding duration (months)	Fund Amount (RM)
1	Nor Azalina Rosli	Mdm Rosmina Ahmad Bustami Dr. Leonard Lim Mdm Amira Safirawaty bt Mohamed Pauzan Mohd Hafiz b. Zawawi	Low Cost Adsorbents Derived from Banana Peels for Dye Removal	12	6,000
2	Mohd Azrin Mohd Said	Dr. Abdullah Yassin Dr. Syed Tarmizi Syed Shazali Prof. Madya Dr. M. Shahidul Islam, Ahmad Adzlan Fadzli, Hishammudin Afifi	Analysis of Driver Car Seat Design in-term of Ergonomics and Safety Aspects	12	5,000

3	Mr. Martin Anyi	Prof. Madya Ir. Dr. Mohd Shahril Osman	Construction and Installation of a Simplified Reaction Turbine for off-grid communities in Sarawak, Malaysia	12	9,400
4	Dr. Lim Soh Fong	Dr. Rubiyah Baini Prof. Madya Dr. Khairuddin Sanaullah	Transforming Banana and Cassava Peels (Agro Wastes) into Biosorbents for Removing Aqueous Contaminants	12	4,000
5	Rohaida Affandi	Dr. Siti Halipah Ibrahim Prof. Madya Dr. Azhaili Baharun	Study on Effect of Pattern of the Roofing Materials towards Surface Temperature Underneath	12	5,000
6	Dr. Nicholas Kuan Hoo Tien	Prof. Dr. Amir Azam Khan	Characterisation of Biodegradable *Pandanus Atrocarpus* based on Composite for Lightweight Environmentally – Friendly Design	12	4,300
7	Mdm Dayangku Salma Awang Ismail	Prof. Madya Dr. Siti Noor Linda Taib	Study on the Suitability of Biowastes - The POFA and Sago Ash as Soil Stabilizers	12	5,200
8	Abdul Azim Abdullah	Prof. Madya Dr. Wan Azlan Wan Zainal Abidin Dr. Siti Halipah Ibrahim Prof. Dr. Abdul Mannan	Affordable Lifestyle House in Kuching Measured Through Thermal Comfort	12	6,900
9	Dr. Magdalene Andrew Munot	Ervina Junaidi Marini Sawawi Dr. Nordiana Rajaee Prof. Madya Ir. Dr. Mohd Shahril Osman	Identification of Local Product Packaging Concepts in Sarawak	12	5,500

RESEARCH PUBLICATIONS

Journals

1. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012), Investigating of Solar Photovoltaic Module Power Output by Various Models, NED University Journal of Research, Thematic Issue on Energy 2012, ISSN 1023-3873. pg. 25-34.

2. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012), Cost estimation of Standalone photovoltaic Power System In Remote Areas of Sarawak, Malaysia, NED University Journal of Research, Thematic Issue on Energy 2012, ISSN 1023-3873, pg 15-24.

3. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012), Estimation of Carbon Footprints from Diesel Generator Emissions, 2012 International Conference in Green and Ubiquitous Technology 978-1-4577-2171-7/12/©2011 IEEE, pp 78-81.

4. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012), Life Cycle Cost Analysis of a Standalone PV System, 2012 International Conference in Green and Ubiquitous Technology , 978-1-4577-2171-7/12/ ©2011 IEEE, pp. 82- 85.

5. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, S.R. Samo, and S.A. Kamboh (2012), A Novel Analytical Model for Optimal Sizing of Standalone Photovoltaic Systems. Energy. ISSN: 0360-5442 (In Press).

6. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit and S.R. Samo (2012), Model for Estimation of Global Solar Radiation in Sarawak, Malaysia, World Applied Sciences Journal 14 (Special Issue of Food & Environment): 83-90, 2011. ISSN 1818-4952.

7. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit and S.R. Samo (2012), Assessment of Solar and Wind Energy Resources at Five Typical Locations in Sarawak, Journal of Energy & Environment, Vol. 3, 2012, 8-13. ISSN: 1985-7462.

8. A. Yassin, M.I. Shahidul, A.K. Othman, Z. Hushairi, B. Azhaili, S.T. Syed Shazali, A.H. Ruduan and S.M.A. Liakbar (2013). Optimization of Green Energy Extraction: An Application of Single Stage Cross-Flow Micro-Hydro Turbine, Journal of Manufacturing Operations Research and Sustainability, Vol. 1, No. 1, pp. 7-12.

9. M.I. Shahidul and W. Che Mat (2013). Nanopore Membrane in Water Treatment Chemical Reclamation: A Pilot Study towards Environmental Sustainability, Journal of Manufacturing Operations Research and Sustainability, Vol. 1, No. 1, pp. 7-12.

10. M.I. Shahidul, S.T. Syed Shazali, A. Yassin, C.H. Ting, H.A. Huspi, M.S.M. Azrin and A.F.K. Adzlan (2013). Measuring Machinery Capacity Utilization and Its Impact on Manufacturing Performance and Environment, Journal of Manufacturing Operations Research and Sustainability, Vol. 1, No. 1, pp. 7-12.

11. M.S.M. Azrin and N. Ismail (2013). Improvement of Production Line layout Using Arena Simulation Software, Applied Mechanics and Materials Vols. 446-447 (2014) pp. 1340-1346, Trans Tech Publications, Switzerland.

12. M.S.M. Azrin and N. Ismail (2013). Virtual Production Line Layout Modeling Using Arena Simulation Software, Applied Mechanics and Materials Vol. 393 (2013), pp. 42-48, Trans Tech Publications, Switzerland.

13. A.S Jamaluddin, A. Yassin (2013), "Machinability Analysis on Laser Sintered Materials with Finite Element Method" Asian Journal of Engineering, Sciences & Technology, 2013, Volume 3, Issue 1, 7-14.

14. Aziz, M S A, T. Ueda, T. Furumoto, S. Abe, A. Hasokawa, A. Yassin (2012), Study on Machinability of Laser Sintered Materials Fabricated By Layered Manufacturing System: Influence of Different Hardness of Sintered Materials, Procedia CIRP 4(0), 2012, pg 79-83.

15. A.S Jamaluddin, A. Yassin, M. S. Osman (2012), Study On Ball End Milling Process Using Two Dimensional Finite Element Method, Jurnal Mekanikal, June 2012, No.34, 1-15

16. I.H. Ling, D.C.L. Teo (2013). EPS RHA Concrete Bricks – A New Building Material, Jordan Journal of Civil Engineering, Vol. 7, No.4, pp. 361-370.

17. Ivy Tan Ai Wei, Leonard Lim Lik Pueh, Nor Azalina Rosli and Ling Tiew Huang (2013). Derivation of Oil Palm Shell-Based Adsorbent Using H2SO4 Treatment for Removal of Atrazine from Aqueous Solutions. Malaysian Journal of Civil Engineering, Vol. 25, pp. 45-57.

18. I.A.W. Tan, and B.H. Hameed (2012). Removal of Crystal Violet Dye from Aqueous Solutions Using Rubber (hevea brasiliensis) Seed Shell-Based Biosorbent. Desalination and Water Treatment, Vol. 48, pp. 174-181.

19. Yeo, T.H.C., Tan, I.A.W. and Abdullah, M.O. (2012). Development of Adsorption Air-Conditioning Technology Using Modified Activated Carbon – A Review. Renewable and Sustainable Energy Reviews, Vol. 16, pp. 3355-3363.

20. M. Andrew-Munot and R. N. Ibrahim, 2013. "Remanufacturing Process and Its Challenges". Journal of Mechanical Engineering and Sciences (JMES). E-ISSN:2231-8380; Volume 4, pp. 488-495, June 2013.

21. N.Rostam Afshar, and H. Fahmi (2012). Rainfall Forecasting Using Fourier Series, Journal of Civil Engineering and Architecture(USA), Volume 6, No. 9 (Serial No. 58), pp.1258–1262.

22. N. Rostam Afshar, and M. Abdoli (2012). Evaluation of Run-Off Supply Projects in Hamadan (Iran), Journal of GEOMATE(Japan), Vol. 3, No.2(Sl. No. 6), pp. 389-391.

23. R. Sapawi, R.K. Pokharel, S.A.Z Murad, A. Anand, N. Kiorala, H. Kanaya, K. Yoshida (2012). Low Group Delay 3.1-10.6 GHz CMOS Power Amplifier for UWB Applications, IEEE Microwave and Wireless Components Letters, Volume 22, No. 1, pp: 41-43, ISSN: 1531-1309.

24. Rohana Sapawi, Sohiful Anuar Zainol Murad, Dayang Azra Awang Mat (2012). 5-11 GHz CMOS PA with 158.9±41 ps Group Delay and Low Power Using Current-Reused Technique, International Journal of Electronics and Communication, pp. 928-932.

25. Rohana Sapawi, Ramesh K. Pokharel, Haruichi Kanaya, Keiji Yoshida (2012). A Wide Range CMOS Power Amplifier with Improved Group Delay Variation and Gain Flatness for UWB Transmitters, IEICE Transaction on Electronics, Vol. E95-C, No. 7.

26. R. Sapawi, R.K Pokharel, D.A.A. Mat, H. Kanaya and K. Yoshida (2012). A 0.9-3.5 GHz High Linearity, Good Efficiency CMOS Broadband Power Amplifier Using Stagger Tuning Technique, Microwave and Optical Technology Letters.

27. Prashobh Karunakaran and Mohammad Shahril Osman (2012). Optimization of A Flexible Manufacturing System (FMS) For High Technology Product Producing Factory Via The Modularization Of Production, International Journal Mechanical Engineering and Robotics Research, Vol 1, No1, pp 1 – 13.

28. Prashobh Karunakaran and Mohammad Shahril Osman (2013), A Study Into The Feasibility Of Consumers Triggering Factory Robots To Start Production Over The Internet To Optimize The Current Purchasing System, Journal of Manufacturing Engineering, Vol. 8, Issue. 2, pp 71-74.

29. Mohammad Shahril B. Osman and Christopher J. Boniface (2013), Preliminary Study On Thermal Comfort, Heating Ventilation And Air Conditioning (Hvac) Systems In Dewan Tunku Abdul Rahman Putra (Detar Putra) Unimas, Vol. 1, N0.1, pp 32 – 38.

30. S. K. Sahari, A. Ohta, M. Matsui, K. Mishima, H. Murakami, S. Higashi, and S. Miyazaki (2013). Kinetics of Thermally Oxidation of Ge(100) Surface, Journal of Physics: Conference Series 417 012014
31. K. Mishima, H. Murakami, A. Ohta, S. K. Sahari, T. Fujioka, S. Higashi, and S. Miyazaki, (2013). Characterization of Ultrathin Ta-oxide Films Formed on Ge(100) by ALD and Layer-by-Layer Methods, - Journal of Physics: Conference Series 417 , 012013
32. L.L Wong, H Asrah, M.E Rahman, M.A Mannan (2013). Effects of aggressive ammonium nitrate on durability properties of concrete using Sandstone and Granite aggregates, World Academy of Science, Engineering and Technology, vol. 73, pp. 1107-1111
33. S Imbin, S Dullah, H Asrah, P.S Kumar, M.E Rahman, M.A Mannan (2013). Performance of concrete grout under aggressive chloride environment in Sabah, 2013, World Academy of Science, Engineering and Technology, vol. 73, pp. 1171-1175
34. M.R. Rahman, J.Lie, S.Hamdan,A.A. Saleh, R. Baini and S.F.Salleh (2013) Combined Styrene/MMA/Nanoclay Cross-linker Effect on 2 Wood-Polymer Composites (WPCs). Journal of Bioresources,Vol. 8, no),pp. 4227-4237.
35. K. S. Kiew, S. Hamdan, and M. R. Rahman (2013) Comparative Study of Dielectric Properties of Chicken Feather/Kenaf Fiber Reinforced Unsaturated Polyester Composites, Journal of Bioresources, Vol. 8, no.2, pp. 1591-1603.
36. S. Hamdan, M. S. Islam, A.A Saleh, M. R. Rahman,and M.Rusop. (2013) Study on Thermal and Biodegradation Resistance of Tropical Wood Material Composites. Journal of Applied Polymer Science. Vol. 128, no. 3, pp. 1842–1847.
37. M. S. Islam, S. Hamdan, H. R. Sobuz, M.R. Rahman and A. A. Saleh. (2013), Thermal and decay-resistance properties of tropical wood–plastic composites, Journal of composites Materials. Vol. 47,no.12, pp. 1493-1500.
38. M. S. Islam, S.Hamdan, M. Hasan, M. Rusop, M. R. Rahman, M. A. M. Mohd Idrus(2013) Physico-mechanical and Decay Resistance Properties of Chemically Modified Tropical Wood Material. Journal of Applied Polymer Science. Vol.127, no 3, pp. 1555–1560.
39. M. S. Islam, S. Hamdan, and M.R. Rahman. (2013) Mechanical and Morphological Properties of Tropical Wood Polymer Nanocomposite (WPNC) Advanced Materials Research Vol. 667, pp. 200-205.
40. M. S. Islam, S. Hamdan, and M.R. Rahman. (2013) Thermal Stability and Decay Resistance Properties of Tropical Wood Polymer Nanocomposites (WPNC). Advanced Materials Research Vol. 667, pp. 482-489
41. Mohammad Omar Abdullah, Lim Pai Yii, Ervina Junaidi, Ghazali Tambi, Mohd Asrul Mustap, Energy and Buildings, Available online 16 August 2013,http://dx.doi.org/10.1016/j.enbuild.2013.08.008
42. Harunal Rejan Ramji, Sing Lim Leo, Mohammad Omar Abdullah (2013). Parametric study and simulation of a heat-driven adsorber for air conditioning system employing biomass-based activated carbon-methanol working pair, Applied Energy, 10.1016/j.apenergy.2013.07.017 (2011 Impact factor = 4.781).
43. T.H.C. Yeo, I.A.W. Tan, M. O. Abdullah (2012), Development of adsorption air-conditioning technology using modified activated carbon - A review, Renewable and Sustainable Energy Reviews, Volume 16 Issue 5, pages 335-3363, (2012 impact factor: 5.627)
44. N.M Sutan and S. Hamdan (2013).Efflorescence Phenomenon on Concrete Structures, Advanced Materials Research Journal ,AMR.626.747 Vol.626 (2013,) pp. 747-750.
45. L. S Kiong and N.M. Sutan (2013). Initial Surface Absorption of pozzolan and polymer modified mortar , UNIMAS E-journal of Civil Engineering Volume 4 (Issue 1) April 2013,pp. 8-12.
46. O. M. Wei and N.M. Sutan (2013).The influence of Finely Ground Mineral Admixture (FGMA) on efflorescence , UNIMAS E-journal of Civil Engineering Volume 4 (Issue 1) April 2013 pp. 50-55.
47. N. M. Sutan ,I. Yakub and S. Hamdan (2013). Physicochemical characterization of polymer composite cement systems ,WIT Transactions on the Built Environment (ISSN: 1746-4498, Digital ISSN: 1743-3509)
48. N.M. Sutan ,S. Hamdan, A. Baharon and C.Y. Lee (2012) , Initial Surface Absorption Test for Polymer Cement Composite System ,e-Journal of Nondestructive Testing & Ultrasonics, ISSN: 1435-4934.
49. N.M.Sutan, I. Yakub, S. N. A. M.Musa (2012). Advances in Intelligent and Soft Computing: Potential Application of Service Science in Engineering in Advances in Intelligent Systems & Computing, Springer-Verlag: Berlin. ISBN: 978-3-642-30866-2
50. I. Ismail, S.A. Bernal, J.L. Provis, R. San Nicolas, D.G. Brice, A.R. Kilcullen, S. Hamdan, J.S.J. Van Deventer (2013). Influence of fly ash on the water and chloride permeability of alkali-activated slag materials. Construction and Building Materials, Vol. 48 pp.1187–1201.
51. I. Ismail, S.A. Bernal, J.L. Provis, S. Hamdan, J.S.J. Van Deventer (2013). Drying-induced changes in the structure of alkali-activated pastes. Journal of Materials Science. Vol. 48, No. 9, pp. 3566-3577.
52. I. Ismail, S.A. Bernal, J.L. Provis, S. Hamdan, J.S.J. Van Deventer (2013) Microstructural changes in alkali activated fly ash/slag geopolymers with sulfate exposure. Materials and Structures. Vol. 46 No. 3, pp. 361-373.
53. Fizzahutia Bt Taha, and S.R. Kaniraj (2013). Study of Soil Erosion at a Site near Chemical Engineering Laboratory in UNIMAS, UNIMAS E-journal of Civil Engineering, Vol. 4, No. 2. Accepted
54. S.R. Kaniraj, V. Gayathri, and V.G. Havanagi (2012). Stabilization of Indian Fly Ashes with Soils, Cement, and Randomly Oriented Fibers, UNIMAS E-journal of Civil Engineering, Vol. 3, Special Issue.
55. R. Mansyur, M.R. Kabit and W.H.W. Ibrahim (2012). Expert System for Mobility Management Scheme (E-MMS): Step toward Green Mobility, Research Update, Vol. 8, No. 2, pp. 16, ISSN: 1675-5820.
56. R. Mansyur, R.A.O.K. Rahmat and A. Ismail (2013). A Prototype Rule-Based Expert System for Travel Demand Management, Unimas e-Journal of Civil Engineering, Vol. 4, No. 1, pp. 34-39.
57. M. Sawawi,T.Y Wang,D.R Nisbet, G.P Simon(2013). Scission of electrospun polymer fibres by ultrasonication. Polymer Journal, 54(16), pp 4237-4252.
58. A.Q. Jakhrani, A.R.H. Rigit, S.R. Samo (2013). Estimation of tidal stream energy resources at Sarawak coastline and their Potential Impact on Environment. Australian Journal of Basic and Applied Sciences, 7 (6), pp. 503-514.
59. A.R.H.Rigit, A.Q. Jakhrani, S.A. Kamboh, W.H. Kong, K.A. Samo (2013). Mapping of tidal stream energy resources in the coastline of Sarawak. World Applied Sciences Journal, 22 (9), pp. 1252-1261.
60. A.R.H. Rigit, A.Q. Jakhrani, S.A. Kamboh, P.T.K. Low (2013). Development of an Indirect Solar Dryer with Biomass Backup Burner for Drying Pepper Berries. World Applied Sciences Journal, 22 (9), pp. 1241-1251.
61. A.Q. Jakhrani, S.R. Samo, A.R.H. Rigit, S.A. Kamboh (2013). Selection of models for calculation of incident solar radiation on tilted surfaces. World Applied Sciences Journal, 22 (9), pp.1334-1343.
62. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, S.R. Samo, S.A. Kamboh (2013). Sensitivity analysis of a standalone photovoltaic system model parameters. Journal of Applied Sciences, 13 (2), pp. 220-231.
63. Ivy Tan Ai Wei, Leonard Lim Lik Pueh, Nor Azalina Rosli and Ling Tiew Huang (2013). Derivation of Oil Palm Shell-Based Adsorbent Using H_2SO_4 Treatment for Removal of Atrazine from Aqueous Solutions. Malaysian Journal of Civil Engineering, Vol. 25, pp. 45-57.
64. I.A.W. Tan, and B.H. Hameed, (2012). Removal of Crystal Violet Dye from Aqueous Solutions Using Rubber (hevea brasiliensis) Seed Shell-Based Biosorbent. Desalination and Water Treatment, Vol. 48, pp. 174-181.

65. T.H.C. Yeo, I.A.W. Tan, and M.O. Abdullah (2012). Development of Adsorption Air-Conditioning Technology Using Modified Activated Carbon – A Review. Renewable and Sustainable Energy Reviews, Vol. 16, pp. 3355-3363.
66. S.A. Kamboh, J. Labadin, A.R.H. Rigit (2013). Computational Modeling and Simulation of Electrohydrodynamic (EHD) Ion-Drag Micropump with Planar Emitter and Micropillar Collector Electrodes. Journal of Physics: Conf. Ser. 418, art. no. 012072, doi:10.1088/1742-6596/418/1/012072.
67. W.Z. Kwong, I.A.W. Tan, N.A. Rosli, and L. L. P. Lim (2013) Removal of Toluene from Aqueous Solutions Using Oil Palm Shell Based Activated Carbon: Equilibrium and Kinetics Study. Pertanika Journal of Science and Technology, accepted for publication.

Conferences

1. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling and R. Baini (2012). Prediction of Power output from Different Photovoltaic Cell Models, 2nd International Conference on Energy and Environment: Role of Energy Resources in Sustainability of Environment, 16th -18th of January, 2012, Organized by Energy and Environment Engineering Department, Quaid-e-Awam University of Engineering, Science and Technology, Nawabshah, Sindh, Pakistan
2. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012). Estimation of Carbon Footprints from Diesel Generator Emissions, International Conference in Green and Ubiquitous Technology (GUT 2012), Bandung, Indonesia
3. A.Q. Jakhrani, A.K. Othman, A.R.H. Rigit, L.P. Ling, R. Baini, S.R. Samo (2012), Life Cycle Cost Analysis of a Standalone PV System, International Conference in Green and Ubiquitous Technology (GUT 2012), Bandung, Indonesia
4. M.I. Shahidul, Al-Khalid Othman, Hushairi Zen, S.M.A Liakbar (2012). Optimization of Energy Extraction from In-stream Water Current: An Application of Ducted Cross-Flow Turbine, The 5th BSME International Conference on Thermal Engineering, December 21-23, 2012, Dhaka, Bangladesh.
5. A.K. Othman, H. Zen, L. S. Gunasegaran, Wan Azlan Wan Zainal Abidin, Kismet Anak Hong Ping (2012). Dynamic Route Search Protocol for Underwater Acoustic Network Discovery and Localization, 4th International Conference on Underwater System Technology: Theory and Applications 2012, 4th – 6th December 2012, Kuala Lumpur.
6. N.P. Chai, W.A.W.Z. Abidin, A.K. Othman, H. Zen, and K. Hong Ping (2012). Recent Progress and
7. Development of Vehicle Monitoring System for Accident Prevention, EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching, Sarawak.
8. N.P. Chai, W.A.W.Z. Abidin, A.K. Othman, H. Zen, and K. Hong Ping (2012). Real-time Heavy Vehicle Monitoring Using GPS and GIS Technology: Conceptual Design, EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching, Sarawak.
9. H. Zen, A.K Othman, A.S.W. Marzuki (2012), Performance of AODV and DSDV Routing Protocol in 802.15.4 for Wireless Sensor Network, EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching, Sarawak
10. T. Y. E. John, W. A. W. Z. Abidin, A. Baharun, A. K. Othman, and T. Masri (2012). Adaptive Solar Energy System for Low-Cost Home Cooling System: Conceptual Design, EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching, Sarawak.
11. Kismet Hong Ping, A.K. Othman (2012). 2-D Reconstruction of Breast Image Using Forward-Backward Time-Stepping Method for Breast Tumour Detection, APACE2012.
12. A.K. Othman, H. Zen, A. Baharun, T. Masri, W.A Wan Zainal Abidin, W.H. Wan Ibrahim, K. Ab Hamid (2013). Holistic Framework for Community Based Micro Hydro Development, World Hybrid Conference 2013, 29 September- 1 October 2013, UNIMAS, Kota Samarahan, Sarawak, Malaysia.
13. A.K. Othman, H. Zen, A. Baharun, T. Masri, W.A Wan Zainal Abidin, W.H. Wan Ibrahim, K. Ab Hamid (2013), Sustainable Community Based Micro Hydro: Framework and Case Study, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
14. A.K. Othman, H. Zen, A.Q. Jakhrani (2013)., Study on Potential of Solar and Wind Power In Sarawak, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
15. A.K Othman, N. Abdul Rahman, K. Ab Hamid (2013). SWOT Analysis and Employability in SCORE Development: Energy Sector, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
16. A.K Othman, H. Zen, K. AB Hamid (2013). Infrastructure and Implementation Strategies for ICT Telecentre in Rural Area: Building Structure Design and Approaches of Using Renewable Energy, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
17. A.K Othman, H. Zen, K. Ab Hamid, P. Bala, H. Mohamad Basri, K. Lias, M. D. Ibrahim, N. Abdul Rahman, M. F. Atan, A. S. Abdullah (2013). Rural Transformation Centre:
18. Strategic Planning and Action Plan on Infrastructure Development for Telecentre Programme among Orang Asli (TPOA) in West Malaysia, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia
19. H. Mohamed Basri, Y.C. Thien, S.K.Oothayer Kumar, K. Lias, H.Zen, A.K.Othman (2013. Inverter Design and Control for Photovoltaic (PV) Applications, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
20. Nazeri Abdul Rahman 1, Asyraf Fadhullah Narawi2, Mohd Farid Atan1, Al-Khalid Othman3, Hushairi Zen3, Hazrul Mohd Basri3, Azfar Satari Abdullah3, and Mohd Danial Ibrahim2 (2013).Feasibility Study of Sustainable Pellet-Power Generation for Sarawak Isolated Areas, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
21. Nazeri bin Abdul Rahman 1, Akmal Hisyam bin Ruduan@Raduan2, Mohd Farid Atan1, Al-Khalid Othman3, Hushairi Zen3, Hazrul Mohd Basri3, Azfar Satari Abdullah3, and Mohd Danial Ibrahim2 (2013).Sustainable Pelletisation of Metroxylon Sagu Plantation Biomass Wastes for Power Generation, World Hybrid Conference 2013, 29 September- 1 October 2013,UNIMAS, Kota Samarahan, Sarawak, Malaysia.
22. C.H. Ting, M.I. Shahidul, S.T. Syed Shazali and Y. Abdullah (2013). Measuring Contextual Impact of Maintenance on Machinery Capacity Utilization and Environment, 6th Engineering Conference on Energy and Environment, ENCON 2013, 2-4 July, 2013, Kuching Sarawak.
23. A. Yassin, M.I. Shahidul, A.K. Othman, Z. Hushairi, A. Baharun, S.T. Syed Shazali, A.H. Ruduan and S.M.A. Liakbar (2013). Optimization of Green Energy Extraction: An Application of Cross-Flow Micro-Hydro Turbine, 6th Engineering Conference on Energy and Environment, ENCON 2013, 2-4 July, 2013, Kuching Sarawak.
24. M.I. Shahidul and W. Che Mat (2013). Hybrid Nanopore Membrane in Water Industry: A University-Industry Partnership Research towards Environmental Sustainability, 6th Engineering Conference on Energy and Environment, ENCON 2013, 2-4 July, 2013, Kuching Sarawak.

25. A.F.K. Adzlan, M.I. Shahidul, S.T. Syed Shazali, A. Yassin, M.M.S. Azrin, H.A. Huspi and C.H. Ting (2013). Investigation on Water Consumption pattern in Traditional Malaysian Kampung: An Insight Study on Water and Environmental Issues, 6th Engineering Conference on Energy and Environment, ENCON 2013, 2-4 July, 2013, Kuching Sarawak.
26. S. M. W. Masra, P. K. Pang, M. S. Muhammad and K. Kipli (2012). Application of Particle Swarm Optimization in Histogram Equalization for Image Enhancement, IEEE Colloquium on Humanities, Science and Engineering Research, CHUSER 2012, 3-4 December, 2012, Kota Kinabalu, Sabah, Malaysia.
27. M. S. Muhammad, Y. W. Thoo and S. M. W. Masra (2012). Sound Navigation Aid System for the Vision Impaired, IEEE Colloquium on Humanities, Science and Engineering Research, CHUSER 2012, 3-4 December, 2012, Kota Kinabalu, Sabah, Malaysia.
28. K. V. Selvan, M. S. Muhammad and S. M. W. Masra (2012). Ensembles of DNA Letters for the Design of Unique DNA Library Using a Modified Version of Multi-Criteria VEDEPSO Optimizer, IEEE Congress on Evolutionary Computation, CEC 2012, 10-15 June, 2012, Brisbane, Australia.
29. S. M. W. Masra, A. A. M. A. Shafiee and M. S. Muhammad (2013). Color Blind Image Correction, 2nd International Conference on Advances in Electronic Devices and Circuits, EDC 2013, 4-5 May, 2013, Kuala Lumpur, Malaysia.
30. Krishna Veni Selvan, Mohd Saufee Muhammad and Sharifah Masniah Wan Masra (2013). VEDEPSO Algorithm for Designing Unique Library of DNA Strands, 2nd International Conference on Advances in Computer and Information Technology, ACIT 2013, 4-5 May, 2013, Kuala Lumpur, Malaysia.
31. M.S.M. Azrin and N. Ismail (2013). Improvement of Production Line Layout Using Arena Simulation Software, 2013 International Conference on Manufacturing and Optimization, ICMO 2013, 16-17 September, 2013, New Delhi, India.
32. M.S.M. Azrin and N. Ismail (2013). Virtual Production Line Layout Modeling Using Arena Simulation Software, 2013 International Conference on Advances in Mechanical Engineering, ICAME 2013, 28-29 August, 2013, Melaka, Malaysia.
33. C. H. Ting, M. I. Shahidul, S. T. Syed Shazali, and A. Yassin (2013)." Measuring Contextual Impact of Maintenance on Machinery Capacity Utilization and Environment, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak
34. A. A. Fadzli Khairi, M. I. Shahidul, S. T. Syed Shazali, A. Yassin, Mohd. Azrin Mohd Said, H.A. Huspi, and C. H. Ting (2013). Investigation on Water Consumption Pattern in Traditional Malaysian Kampung: An Insight Study on Water and Environmental Issues, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak
35. A Yassin. , Shahidul M.I., Al-Khalid Othman , Hushairi Zen , Azhaili b Baharun , S. T. Syed Shazali , A.H. Ruduan , S.M.A. Liakbar (2013). Optimization of Green Energy Extraction: An Application of Cross-Flow Micro-Hydro Turbine, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak
36. M. I. Shahidul , M. S. Osman, S. T. Syed Shazali, A. Yassin., C. H. Ting, H.A. Huspi, M. S. M Azrin, and A. F. K. Adzlan (2013), Measuring Production Capacity Utilization and Its Impact on Manufacturing Performance and Environment, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak (Best paper award)
37. S.T. Syed Tarmizi, H.M. Johan, A.Yassin, M.I.Shahidul, M.Adrew-Munit, M.S. Osman, and M.A Mohd Said (2013), Effects of Automated Manufacturing System towards Workforce's Behaviours, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak
38. C.Y. Teo and A.Yassin (2013), Temperature Measurement Using Slip Ring in Milling, ENCON 2013, 6th International Engineering Conference, Energy and Environment, 2nd-4th July 2013, Kuching Sarawak
39. A. Yassin, T., Ueda, S. T. S. Shazali (2012), Experimental Study On Machinability Of Laser-Sintered Material In Ball End Milling, International Conference On Aerospace, Mechanical, Automotive And Materials Engineering (ICAMAME 2012) 28-29 November 2012, Paris, France.
40. S. T. S. Shazali, Rosli. M, A. Yassin (2012), Human Stress-Centered Behavioral Study Related To Small And Medium Enterprises – A Malaysian Perspective 10th International Conference on Manufacturing Research ICMR2012, 11 - 13 September 2012, Aston University, Birmingham, UK
41. A. Yassin, A. S. Jamaludin (2012), Laser Sintered Materials Machinability Analysis With Finite Element Method, 5th Engineering Conference ,(5th EnCon) 2012.
42. C.C. Thong, D.C.L. Teo, C.K. Ng (2013). Compressive Strength and Depth of Chloride Penetration of Concrete Containing Palm Oil Fuel Ash (POFA), 6th Engineering Conference on Energy And Environment, EnCon 2013, 1-4 July, 2013, Kuching, Sarawak.
43. E.P.K. Yong, D.C.L. Teo, N. Mohamed Sutan (2013). The Effects of Elevated Temperatures on Concrete Containing Agricultural Waste Palm Oil Fuel Ash (POFA) as Cement Replacement, 6th Engineering Conference on Energy And Environment, EnCon 2013, 1-4 July, 2013, Kuching, Sarawak.
44. W.W.S Chai, D.C.L. Teo, C.K. Ng (2013). Mechanical Properties of Concrete Produced from Waste Oil Palm Shell (OPS) Coated with PolyVinyl Alcohol (PVA) as Aggregates, Sustainable Engineering Society (SENG) 2013 Conference, SENG 2013, 18-20 September, 2013, Canberra, Australia.
45. S.T. Syed Shazali, H.M. Johan, A. Yassin, M.I.Shahidul, M. Andrew-Munot, M.S. Osman and M. A. Mohd Said, 2013. Effects of Automated Manufacturing System Towards Workforce's Behaviours. Proceedings of 6th International Engineering Conference (ENCON2013). ISBN: 978-981-07-6059-5
46. D. S. A. Mahmod, M. Andrew- Munot, A. A. Khan, N. Glandut and J-C. Labbe, 2013. Advanced Materials for Low Temperature Solid Oxide Fuel Cells (LTSOFCs): A Review. Proceedings of 6th International Engineering Conference (ENCON2013). ISBN: 978-981-07-6059-5.
47. E. Junaidi, M. H. A. Abu-Bakar, S. N. L. Taib, M. Andrew-Munot and M. S. Osman, 2012. Identification of Functional Requirements of Rice Milling Machine for Local Applications. Proceedings of 1st International Conference on Design and Innovation, 2012 . SUSTAINABLE GROUND, Unimas.
48. N. Rostam Afshar, and Hosaini (2013). Evaluation of Buffere zone in Haraz river in Iran, 35th International association of hydraulic research (IAHR) World Congress, 8 to 13 September, 2013, Chengdu, China.
49. N. Rostam Afshar , and M. Abdoli (2012). Evaluation of Run-Off Supply Projects in Hamadan, Iran, Second International Conference on Geotechnique, Construction Materials & Environment, 14-16 November, 2012, Kuala Lumpur, Malaysia
50. N.Rostam Afshar, and H. Fahmi (2012), Rainfall Forecasting Using Fourier Series, 5th Engineering Conference, Engineering Towards Change, Empowering, Green Solutions, ENCON 2012, 10-12th July, 2012, Kuching, Sarawak.
51. Christopher J. Boniface and Mohammad Shahril Osman (2013). Indoor Air Quality In UNIMAS DeTAR PUTRA Convocation, 6th Engineering Conference, "Energy and Environment" 2 – 4 July 2013, Kuching Sarawak
52. A. Ohta, S. K. Sahari, M. Ikeda, H. Murakami,S. Higashi and S. Miyazaki (2012). Dry Oxidation of Germanium (100) and (111) Surfaces - Impact of Oxidation Temperature on Ge Oxide Growth, 2012 Int.Conf. Solid State Dev. Mat.(SSDM 2012) 25-27 Sept., 2012, Kyoto, Japan

53. A. Ohta, S. K. Sahari, M. Ikeda, H. Murakami, S. Higashi, and S. Miyazaki (2012), Temperature Dependence of Dry Oxidation of Germanium, The 59th Spring Meeting, 2012 : The Japan Society of Applied Physics, 15-18 March, 2012 , Waseda University, Tokyo, Japan

54. A. Ohta, S. K. Sahari, M. Ikeda, M. Matsui, K. Mishima, H. Murakami, S. Higashi, and S. Miyazaki (2012), Thermal Oxidatioin of Ge Surface – Impact of Oxidation Temperature on Ge Oxide

55. S.F. Lim, M.O. Abdullah, A.R. H. Rigit, Solid State Carbon Sequestration by Utilization of Agro-wastes to Produce Value-added Products, AICHE 2013 Spring Meeting & 9th Global Congress on Process Safety, April 28 - May 2, 2013 Grand Hyatt, San Antonio, Texas, USA.

56. Y. J. Jong and M.O. Abdullah, Initial Evaluation of a Chip Fryer, Proceedings: EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching Sarawak.

57. Tian Chuan Min, Mohd Narzam Jaffar, Iskandar Jobli, Abu Saleh Ahmed, Mohammad Omar Abdullah, Initial Design and Development of a Small Industrial Cooling Water Power Generator, Proceedings: EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching Sarawak.

58. H.R. Ramji, I.A.W. Tan and M.O. Abdullah, Preliminary Study of a Heat-Driven Adsorption Air-Conditioning system using biomass-based activated carbon-Methanol with computer aided system, Proceedings: EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12th July 2012, Kuching Sarawak.

59. I. Yakub,N.M.Sutan and C.S.Kiong (2013). Characterization Of Calcium Silicate Hydrate And Calcium Hydroxide In Nanosilica Binder Composites, ICANM 2013: International Conference & Exhibition on Advanced & Nano Materials,August 12-14,2013 , Quebec, Canada.

60. N.M.Sutan, I. Yakub and S.Hamdan (2013). Physicochemical characterization of polymer composite cement systems, 6th International Conference on Computational Methods and Experiments in Materials Characterisation,4 - 6 June 2013 Siena, Italy.

61. N. M. Sutan, S. Hamdan and I. Yakub (2013). Calcium Carbonate Efflorescence on Pozzolanic Modified Mortar, International Conference on Advances in Structural, Civil and Environmental Engineering –SCEE 2013,ISBN: 978-981-07-6261-2,4-5 May 2013,Kuala Lumpur, Malaysia, pp. 56-59.

62. I. Yakub, K. A.M. Said, M. A. M. Amin, N. A. Zauzi and N. M. Sutan (2013). Characteristics of Carbon-supported Catalysts derived for Low-temperature Selective Catalytic Reduction: A Short Review, 1st International Conference on Chemical, Nano & Sustainable Engineering – ICCNSE'13,29 – 31 March 2013, Kuala Lumpur, Malaysia, pp.118-131

63. N. M. Sutan, I. Yakub, S.Hamdan and C.S.Kiong (2013). Characterization of Calcium Hydroxide (C-H) crystals in Nano Modified Binder (NMB) , Proceedings of the 1st International Conference on Chemical, Nano and Sustainable Engineering – ICCNSE'13,29 – 31 March 2013,Kuala Lumpur, Malaysia, pp.107-117

64. N.M Sutan and S. Hamdan (2012).Efflorescence Phenomenon on Concrete Structures, International Conference on Advanced Material Engineering & Technology 2012, 28 - 30 November 2012, Batu Feringhi, Penang Island, Malaysia.

65. N. M. Sutan, I. Yakub, M. Selbi and S. Hamdan (2013). Correlation between efflorescence intensity and Hydration of pozzolanic modified cement system, Seminar Hasil Penyelidikan Sektor Pengajian Tinggi 2013, 2-3 Julai 2013 UUM, pp 466-458.

66. N. M. Sutan, I. Yakub and T.Wei (2013). Preliminary study on utilizing finely ground waste glass in cementitious materials, Seminar Hasil Penyelidikan Sektor Pengajian Tinggi 2013, 2-3 Julai 2013 UUM, pp 672-679.

67. E.P.K.Yong, D. C. L. Teo, and N. M. Sutan (2013), The Effects of Elevated Temperatures on Concrete Containing Agricultural Waste Palm Oil Fuel Ash (POFA) as Cement Replacement, EnCon 2013, 6th Engineering Conference, On Energy and Environment, 1-4th July 2013, Kuching, Sarawak, Malaysia.

68. N.Tamanna, N. M. Sutan, I.Yakub and D.T.C. Lee (2013).Utilization of waste glass in concrete, EnCon 2013, 6th Engineering Conference, On Energy and Environment, 1-4th July 2013, Kuching, Sarawak, Malaysia.

69. N.M. Sutan, I. Yakub and M.W. Ong (2012), Durability of Nanosilica-based Cement Mortar, 5th Engineering Conference, "Engineering Towards Change- Empowering Green Solution,10-12th July 2012, Kuching,Sarawak

70. N.M. Sutan, S. Hamdan, H. R. Sobuz and Y.L. Chai (2012),Sustainable Polymer Cement Composite System,11th International Conference on Concrete Engineering and Technology 2012 (CONCET 2012), 12-13th June 2012, Putrajaya, Malaysia.

71. Amir Azam Khan, Jean Claude Labbe: Surface Engineering: Glass Metal Coatings designed for Induction Heating of Ceramic Components, Key Note at 13th International Conference on Advanced Materials, (ISAM2013), 23 to 27 September, 2013, Islamabad Pakistan

72. Amir Azam Khan, Andrew Ragai Henry Rigit, David Bong Boon Liang, Phase Change and Corrosion effect on the performance of a High Voltage Transmission Conductor, 6th International Engineering Conference (ENCON2013), 1st to 4th July, 2013, Kuching, Sarawak, Malaysia. Published at www.rpsonline.com.sg, ISBN: 978-981-07-6059-5 :: doi: 10.3850/978-981-07-6059-5_100

73. Dayang Salyani bt Abang Mahmod, Magdalene Andrew Munot, Amir Azam Khan, Nicolas Glandut, Jean Claude Labbe, Advanced Materials for Low Temperature Solid Oxide Fuel Cells (LTSOFCs): A Review, 6th International Engineering Conference (ENCON2013), 1st to 4th July, 2013, Kuching, Sarawak, Malaysia. Published at www.rpsonline.com.sg, ISBN: 978-981-07-6059-5 :: doi: 10.3850/978-981-07-6059-5_149

74. M.D. Ibrahim, J.H. Jong, E. Junaidi, M.S. Osman, A.A. Khan, Improvements of the Aerodynamic and Thermal Characteristics of An S-Shaped Windowed HDD Arm, 2012 ASME-ISPS/JSME-IIP Joint International Conference on Micromechatronics for Information and Precision Equipment (MIPE2012), June 18-20, 2012, Santa Clara, California, USA

75. Ismail L., Provis J.L., Hamdan S., van Deventer J.S.J. (2012),Chloride Diffusion and Pore structure in Geopolymers, The 2nd International Conference on Microdurability, April 2012, Amsterdam, The Netherlands

76. Ismail I., Provis J.L., Hamdan S., van Deventer J.S.J.(2012), Microstructural analysis of geopolymer binders under sulfate exposure, The 11th International Conference on Concrete Engineering and Technology, June 2012, Putrajaya , Malaysia

77. L.J. Lee, S.R. Kaniraj and S.N.L. Taib (2013). Effect of Tidal Fluctuation on Ground Movement and Pore Water Pressure, The 2nd International Conference on Geotechnics for Sustainable Development, GEOTEC HANOI 2013, 28-29 November, 2013, Hanoi, Vietnam, Accepted.

78. S.R. Kaniraj (2013). Soft Soil Improvement by Electroosmotic Consolidation, Soft Soil Engineering Conference 2013, SEIC '13, 17-19 September, 2013, Kuching, Sarawak, Invited Lecture

79. F.S.Y. Kho and S.R. Kaniraj (2013). Evaluation of Stability of Embankments on Soft Soils by Alternative Methods of Construction, Soft Soil Engineering Conference 2013, SEIC '13, 17-19 September, 2013, Kuching, Sarawak.

80. L.J. Lee, S.R. Kaniraj and S.N.L. Taib (2013). Lateral Instability of Piled Riverine Structures in the Estuaries of Sarawak, Soft Soil Engineering Conference 2013, SEIC '13, 17-19 September, 2013, Kuching, Sarawak.

81. S.R. Kaniraj, V. Gayathri, and V.G. Havanagi (2012). Cement and Fiber Stabilization of Indian Fly Ashes, EnCon 2012, 5th Engineering Conference, Engineering Towards Change - Empowering Green Solutions, 10-12 July, 2012, Kuching.

82. D.N.S.D.A. Salleh, A. Lit, and K. Lias (2013). Implementation of Constructive Alignment Approach in Department of Electronic Engineering, Universiti Malaysia Sarawak, 2013 IEEE International Conference on Teaching, Assessment and Learning for Engineering, TALE 2013, 26-29 August, 2013, Bali, Indonesia.
83. R. Mansyur, R.A.O.K. Rahmat and A. Ismail. A Simulation-Based Expert Advisory System for Mobility Management Scheme. 5th Engineering Conference 2012, Engineering toward Change – Empowering Green Solutions, 10-12th, July 2012, Kuching, Sarawak, Malaysia.
84. H. T. N. Kuan, W. J. Cantwell, NSE265: The Mechanical Properties of Recyclable Hemp-Based Fibre Composites and Sandwich Structures, International Congress on Natural Sciences and Engineering, ICNSE Taipei, January 2013.
85. T. Omiya, A. M. N. Aliah, and M. Notomi (2013). Musculoskeletal Simulator Analysis on Low Back Pain, 7th International Symposium on Mechanics, Aerospace and Informatics Engineering, ISMAI 2013, 21-23 February, 2013, Hakone Pax Yoshino, Japan.

Books

1. Mohammad Omar Abdullah (2012), Applied Energy: an introduction, CRC Press, Boca Raton, New York (Text book), 432p. ISBN: 9781439871577
2. M. O. Abdullah (2012),Essential Notes on Applied Energy: for Mechanical & Chemical Engineering Students, UNIMAS Publisher, 192p. ISBN 978-967-5527-15-9
3. N.M. Sutan and M. S. Jaafar (2012), Effectiveness of NDTs for the Detection of Concrete Deterioration.LAP LAMBERT Academic Publishing, Germany. ISBN:978-3-8473-7074-1

6th International Engineering Conference (ENCON2013) 01 – 04 July, 2013, Hilton Kuching, Sarawak, Malaysia

The Faculty of Engineering, Universiti Malaysia Sarawak (UNIMAS) organized the 6th International Engineering Conference (EnCon 2013) from 1 to 4 July, 2013, at Hilton Hotel, Kuching. The theme of this year's Conference was "Energy and Environment". The conference, co–organized with the Centre of Excellence in Renewable Energy (CoERE) and Quaid-e-Awam University of Engineering Science and Technology (QUEST), Pakistan, enabled the sharing of ideas and latest technological advances in fields relevant to the theme among researchers, academicians, engineers and industrial professionals. EnCon is now organized annually after the success of its five previous events held in 2007, 2008, 2010, 2011 and 2012, which managed to gather over 400 participants worldwide.

This year ENCON 2013 was able to attract about 86 technical abstracts and papers not only from Malaysia, but also from around the globe. Abstracts and papers submitted to the conference were subjected to strict review by a qualified technical committee to ensure that papers are of high quality and standard. From the accepted papers, 82 papers were considered for publication in indexed online proceedings through Research Publishing Services (RPS), Singapore. Best Paper Awards were also presented to authors with superior quality paper submission to the conference.

Presentation of souvenir during the opening ceremony of ENCON2013. From left to right, Prof. Dr. Peter Songan, Deputy Vice Chancellor UNIMAS, Prof. Dr. Wan Hashim Wan Ibrahim, Dean Faculty of Engineering, Prof. Datuk Dr. Mohamad Kadim Bin Suaidi, Vice Chancellor of UNIMAS, YB Dato Sri Michael Manyin Anak Jawong, Minister of Sarawak for Infrastructure Development and Communications and Prof. Ir Dr. Andrew Ragai Henry Rigit, Chairman ENCON2013.

Among the focus areas of the conference were Advanced Manufacturing Technology, Conventional and Renewable Energy, Energy Efficiency and Green Technology, Modeling and Simulation, Power Generation and Distribution, Smart Materials for Energy Efficiency, Thermal Engineering, Waste Water Management and special topics on Energy and Environment cycles. Papers related to other relevant topics were also presented.

Main feature of the conference was six prominent keynote addresses by Professor Dr Jean Claude Labbe from University of Limoges, France, Professor Dr Masjuki bn Hj Hasan from University Malaya, Malaysia, Associate Professor Nicolas Glandut from University of Limoges, France, Professor Ir Dr Abd Halim Shamsuddin from Universiti Tenaga Nasional (UNITEN), Dato' Ir. Che Mat bin Wanik, Executive Chairman of Dermaga Builders Sdn Bhd, and Dr Chen Shiun from Sarawak Energy Berhad. The conference also featured a one day pre-conference workshop on topics related to Energy and Environment conducted by Prof. Dr Amir Azam Khan, Assoc. Prof. Dr M Shahidul Islam, and Assoc. Prof. Dr Azhaili Baharun on the 1st of July 2013.

Just after the opening ceremony of the ENCON2013, on 2nd July, UNIMAS also signed two Memorenda of Agreement with University of Limoges, France and Dermaga Builders Sdn Bhd and one Memorandum of Understanding with Universiti Tenaga Nasional (UNITEN), Malaysia

Memorandum signing ceremony with University of Limoges, France. Sitting (from left to right) , Prof. Dr. Wan Hashim Wan Ibrahim, Dean Faculty of Engineering, Prof. Datuk Dr. Mohamad Kadim Bin Suaidi, Vice Chancellor of UNIMAS, Professor Jean Claude Labbe and Dr Nicolas Glandut, University of Limoges, France. The ceremony is witnessed by YB Dato Sri Michael Manyin Anak Jawong, Minister of Sarawak for Infrastructure Development and Communications and Prof. Dr Peter Songan, Deputy Vice Chancellor UNIMAS.

First MoA between UNIMAS and University of Limoges were signed by Prof. Datuk Dr. Mohamad Kadim Bin Suaidi, Vice Chancellor of UNIMAS and Prof. Dr. Jean Claude Labbe, University of Limoges, France, respectively. Second signatories were Prof. Dr. Wan Hashim Wan Ibrahim, Dean Faculty of Engineering, UNIMAS and Dr. Nicolas Glandut from University of Limoges. The MoA between UNIMAS and University of Limoges is to start a joint PhD program between the two Universities. PhD candidate Dayang Salyani bt Abang Mahmod, already registered at Faculty of Engineering, UNIMAS, is working on Low Temperature and High Conductivity Ceramic Ionic Conductors for Solid Oxide Fuel Cells under the joint supervision of Prof. Dr. Jean Claude Labbe and Dr. Nicolas Glandut from University of Limoges, and Prof. Dr. Amir Azam Khan and Dr. Magdalene Andrew Munot from UNIMAS.

Second MoA was signed between UNIMAS and Dermaga Builders Sdn. Bhd. It was signed by Prof. Datuk Dr. Mohamad Kadim Bin Suaidi, Vice Chancellor of UNIMAS and Dato' Ir. Che Mat Bin Wanik, Executive Chairman of Dermaga Builders Sdn. Bhd. Second signatories were Prof. Dr. Wan Hashim Wan Ibrahim, Dean Faculty of Engineering UNIMAS and Dato Hj. Che Min Che Ahmad, Associate Director of Dermaga Builders Sdn. Bhd. Under this MoA the two organizations would work together for the manufacturing of water treatment machineries for industrial and domestic applications for supplying clean water at affordable cost.

The MoU between UNIMAS and UNITEN was signed by Prof. Datuk Dr. Mohamad Kadim Bin Suaidi, Vice Chancellor of UNIMAS and Dato' Seri Prof. Mashkuri Bin Yaacob, Vice Chancellor of UNITEN. The second signatories were Directors of the Centre of Excellence for both universities, Associate Prof. Dr. Azhaili Baharun, Director of Centre of Excellence for Renewable Energy (CoERE), UNIMAS and Prof. Ir. Dr. Abdul Halim Bin Shamsuddin, Director of Centre of Renewable Energy (CRE), UNITEN. The two Centres would focus on critical research and development, consultation, and community services for the application of technologies emphasis on hydroelectric (micro-hydro) power, solar energy, hybrid, biomass, tidal wave, and wind energy sources.

RESEARCH NEWS

Asia Pacific Regional Conference on Solar and Hybrid Technologies UNIMAS

Asia Pacific Regional Conference on Solar and Hybrid Technologies was held from 30th September to 1st October 2013 at Faculty of Engineering, Universiti Malaysia Sarawak, Kota Samarahan, Sarawak and was officiated by YB Datu Hj Len Talip Salleh, Assistant Minister at the Chief Minister Office (Promotion of Technical Education) and Assistant Minister of Environment. The conference was a part of the 20th STEM States International Festival of Science, Technology, Engineering and Mathematics (STEMFest). It is organized by Asia Pacific Society for Solar and Hybrid Technologies and co-organized by UNIMAS, Industry Development Network, The Science Learning Hub Sparking Fresh Thinking, UNESCO, Apollonius, Sarawak Convention Bureau, PASCO, MOSTI, Academy of Sciences Malaysia and Science Education Review AGROLOOK served as a platform for discussion among researchers, academicians, engineers, industrial professionals and postgraduate students on the advancement of industry and technology within the Asia Pacific Region. The conference featured 9 prominent keynote speakers namely Professor Dr Wan Hashim Wan Ibrahim (UNIMAS), Associate Professor Dr Mohammad Omar Abdullah (UNIMAS), Associate Professor Dr Azhaili Baharun (UNIMAS), Professor Ir Dr Abdul Halim Shamsuddin (UNITEN), Dr Peter Thong (IEEPA, China), Professor Dr Nader Barsoum (Asia Pacific Society for Solar and Hybrid Technologies), Mr Goh Wei Chiun (Sarawak Energy Berhad), Ms Sharul Azwa Abd Rani (SPAD, Malaysia) and Dr Stuart Blanch (NGO). The title of keynote speakers covered various topics such as conserving energy through efficiency urban transport management, as Australia-Asia interconnector to drive regional generation and transmission of renewable energy, community based renewable energy development for rural Sarawak: Issues and Challenges, opportunities of Hybrid Renewable Power System into remote electrification in Sarawak, the forces driving hybrid energy in China and Hybrid Energy: Science and Technology.

Pictures:
(L) FENG Dean at the exhibition

(R) Sarawak's Chief Minister present at the opening ceremony

The conference accepted 75 full papers for oral presentation and poster exhibition. Among the topics discussed in the parallel technical sessions were on the latest technology and research outcome on renewable energy and hybrid technology. The conference was attended by about 90 participants not only from Malaysia but also from other countries around the globe.

Faculty of Engineering Wins 4 Medals at iENA 2013 and PECIPTA 2013

The Faculty secured a gold medal for 2 products at the 65th International Trade Fair Ideas-Inventions-New Products (iENA) held in Nuremberg, Germany from Oct 31 to Nov 3, 2013. The medal was awarded to Associate Professor Dr. Abu Saleh Ahmed from the Department of Mechanical and Manufacturing Engineering. The products that captured the attention of the judges and honored with the Gold Medal Award were entitled 'Novel Enzymes for Efficient Bioethanol Production from Solid Biomass' and 'Efficient Biodiesel Production from Jatropha Oil by Using Novel Catalyst as a Clean Fuel for Diesel Engine'. Another product designed by Associate Professor Dr. Siti Noor Linda Taib from the Department of Civil Engineering and her team entitled 'A Shallow Peat / Soft Soil Sampler with Detachable Mold' also managed to obtain a Diploma for the invention.

Dr Abu Saleh (Second from right) showing the Gold Medal Award at 65th International Trade Fair Ideas-Inventions-New Products (iENA) held in Nuremberg, Germany.

Achievements at iENA 2013 continued in the next innovation exhibition, PECIPTA 2013, held in Kuala Lumpur from Nov 7 to Nov 9 2013. Also on the same products, Associate Professor Dr. Abu Saleh Ahmed won 2 Silver Medals while Associate Professor Dr. Siti Noor Linda Taib secured a Bronze Medal for the Faculty.

Dr Siti Noor Linda (Left) and Dr Abu Saleh (Right) continues their excellences in PECIPTA 2013 held in Kuala Lumpur.

Both inventors would like to express their highest gratitude to the Faculty and to the University for giving them this opportunity to showcase their products at both national and international platforms.

UNIMAS-Faculty of Engineering Awarded Honour of Invention, Gold, Silver and Bronze at i-ENVEX 2013

Faculty of Engineering made Universiti Malaysia Sarawak (UNIMAS) proud proving themselves were competent enough when the teams from Mechanical and Manufacturing Engineering Department, Faculty of Engineering, won 5 medals and award of "Honor of Invention" from "World Invention Intellectual Property Association" at the International Engineering Invention and Innovation Exhibition (i-ENVEX 2013) held at UniMAP, Universiti Malaysia Perlis, recently. The event was co-organized with Malaysian Ministry of Higher Education (MoHE), ENVEX Young Research Club (EYReC), Malaysian International Young Inventors Olympiad (MIYIO) and Yayasan Inovasi Malaysia. The event which was held from 16-19 April 2013 was an international expo participated by more than 15 countries, including Canada, Korea, India, Romania and others. There ware altogether five representatives from UNIMAS which four of them were from Mechanical and Manufacturing Engineering Department and one from Electronics Department. This team was led by the lecturer Dr Mohd Danial Ibrahim.Dr Danial was one of the invited jury in the event. The criteria and selection for the awards and medals was tough where most universities have other institutional laboratories and previous internaltional recognitions. UNIMAS teams were distributed to classes of Agriculture, Environmental and Renewble Energy; Biotechnology, Health & Chemicals; Manufacturing Process, Machine & Equipment. Cathy Ambrose who is supervised by Dr Danial Ibrahim with co-researchers as Dr Azham Zulkharnain, Mr Muhd Fadzli Ashari were awarded the "Honour of Invention" and gold medal with the invention of a "Mobile Automated White Pepper Retting Machine Integrated with Crude Enzyme Solution". The product was a collaboration research with the Faculty of Resource Science and Technology of UNIMAS, led by Dr Azham. Bong Sik Hsiang, a student supervised by Ir Dr Mohd Shahril Osman won silver under the tittle of "Design and Development


Dr Danial and team

of Pastry Shell Forming Machine for Small Cottage Industry". Siti Noor Haizum Semait, Tiang Huong Hung and Curt Henning Bartholomew won bronze in the event participated with their research inventions entitled "Painless Needle Quardruple tip Micro-needles", "i-Peg : Smart Clothes Air Drying Solution" and "Automated Pepper Retting Machine", respectively. At the closing ceremony which was held at UniMAP Kapitol Hall, the Royal Highness Tuanku Raja Muda Perlis, D.Y.T.M Tuanku Syed Faizuddin Putra ibni Syed Sirajuddin Jamalullai and Brig. General Dato' Prof. Dr Khamarudin Hussin, the vice Chancellor of UniMAP, witnessed the award and medal presentations to the winners. There were more than 400 participants from numerous institutions of higher learning from all over the world took part in this exhibition. During the same event, there were hundreds of high school students and associations who participated in the MIYIO cluster. The four day symposium welcomed both public and private instituations to join to showcase creative and innovative idea in inculcating engineering advancements and research for the society.

Faculty of Engineering Wins Silver medal at the 4th Exposition on Islamic Innovation 2013 (i-Inova'13)

Dr Resdiansyah Mansyur and Ron Aldrino Chan from Faculty of Engineering earned Silver medal at the 4th Exposition on Islamic Innovation 2013 (i-Inova'13), held at Universiti Sains Islam Malaysia (USIM) from 25th to 27th October, 2013. The award was given to the young Faculty members for their invention called Expert System for Sustainable Transport (E-SUTRA).

The Exposition on Islamic Innovation (i-Inova'13) is an exhibition and competition to introduce innovative products from higher learning institutions and research institutes from Malaysia and other countries. More than 150 participants (Universities from South East Asia such as Malaysia, Indonesia, Brunai Darusalam, etc) were present to contest for awards in this exposition.


From left to right: Dr Resdiansyah Mansyur and Ron Aldrino Chan at the 4th Exposition on Islamic Innovation 2013 (i-Inova'13), showing their product at the University Sains Islam Malaysia.

Recent Research Facilities at the Faculty of Engineering

Faculty of Engineering (FENG), UNIMAS has procured a number of new laboratory equipment for teaching and learning as well as research activities. Among some of the sophisticated and state-of-the-art analytical equipment purchased in year 2012 and 2013 are the Atomic Absorption Spectroscopy Elemental Analysis, Gas Chromatography Flame Ionization Detector (GC-FID), Surface Area Analyzer & Pore Size Analyzer, Distributed Control System (DCS), Pressure Control Rig, Level and Flow Control Rig, Temperature Control Rig, pH Control Rig, Muffle Furnace, Water Purification System, Autoclave (upright), Grinder, Hot Press Machine, Spectrophotometer, TOC Analyzer and Hydrothermal Pretreatment (Acid Hydrolysis) Reactor. All these are located in the Analytical Laboratory and Unit Operation Laboratory, Department of Chemical Engineering and Energy Sustainability.

AAS is an analytical equipment mainly used for measurement of metal elements. The operating principle involves the use of flame or electrical heating so that each of the heated and atomized elements absorb unique wavelength light. The AAS unit available at FENG is manufactured by Shimadzu, Japan, model AA-7000. This unit has two types of atomizer which are flame and graphite furnace. The advantage of flame atomizer is that it gives high stability, quick analysis and measurement at ppm level while graphite furnace atomizer gives measurement at sub ppb level. This AAS unit is equipped with autosampler for ease of application. There is also software included which allows controlling, monitoring, analysis and post-analysis.

GC is a type of chromatography that is commonly used in analytical chemistry for separating and analyzing compounds that can be vaporized without decomposition. There are different types of detectors for GC. The detector for GC available at FENG is flame ionization detector (FID). This equipment is manufactured by Shimadzu, Japan, model GC-2010. FID is the most common and widely used detector as it has the best sensitivity and a wide dynamic range. The FID is also relatively non-selective; therefore it can detect almost all compounds with C-H bond. The carrier gas for this instrument is hydrogen, nitrogen and purified air. This instrument is also equipped with autosampler for ease of application and with software which allows controlling, monitoring and analysis.

Atomic Absorption Spectroscopy Elemental Analysis

Surface Area Analyzer & Pore Size Analyzer

Gas Chromatography Flame Ionization Detector (GC-FID)

A highly sophisticated gas sorption analyzer available at FENG with one or two physisorption analysis ports for surface area analysis and pore size measurements, both of which can be equipped for low pressure micropore analysis including optional 0.1 torr transducer(s). Metal-to-metal (VCR) fittings employed in the measurement manifold(s) for extremely low leak rate, a dedicated Po (saturation pressure) transducer, and a long life dewar (90+ hours, even with two samples) are all standard features. 12mm, 9mm and 6mm sample cells (with or without bulbs) offer the most sample-type flexibility. One port is available as a chemisorption station, complete with high temperature furnace with fan-assisted cooling. The chemi- version is also offered with optional flow-based measurement capabilities (TPX, pulse titration). The chemi station retains full physisorption capability. A vapor dosing option is available for both physi-and chemi-units and features a 50oC thermostatted manifold chamber. The two built-in degas stations (turbo pumped vacuum is standard on the MP and C models) feature computer-controlled ramp/hold/test protocols, a dedicated cold-trap, and optionally a second (dedicated) vacuum system. No need to degas on the analysis stations thus preventing contamination of the analysis section. The host of models, options, accessories, configurations and upgradeability make the Autosorb-iQ the most advanced instrument of its type available today.

The Feedback Distributed Control System (DCS) trainer which is available at FENG is a complete training solution that combines the operations of a leading commercial DCS process management package, namely Emerson's DeltaV, with an assortment of our proprietary training rigs. The training rigs offer a range of processes- Level and, Flow, Temperature, Pressure and Forced Air Cooling. These may be operated separately or combined to produce a multi-process, multi-loop system. The trainer is supplied complete with the PC, software, controller and I/O modules that are needed to monitor and control the process rigs. A control cabinet houses the components that provide the interface between the PC and the rigs. The control cabinet is easily connected to the PC and rigs using the supplied cables The valves, transducers and transmitters associated with the training equipment are standard industrial components that operate using simple 4-20 mA current loop control. The trainer can be used to perform a set of operations that will guide the student from the basics of field components in the process industry to the final control algorithms that are used in various applications.

The Pressure Training System is a single loop pneumatic control system. It enables the study of the principles of both pressure regulation of a process and the control of flow in a pressurised system. The System comprises a low pressure air circuit supported on a bench-mounted panel, making it suitable for individual student work or for group demonstration. The complete equipment 38-001 is a single loop system allowing the study of the principles of process control, using liquid level and flow rates as the measured process variables. The system is a completely self-contained, low pressure flowing water circuit supported on a bench-mounted panel, making it suitable for individual student work or for group demonstrations.

Pressure Control Rig

Level and Flow Control Rig

pH Control Rig

Temperature Control Rig and Forced

The Temperature Process Trainer 38-002 is a complete equipment with a two loop system using water as the process fluid which allows the study of the principles of process control using primary and secondary circuit temperatures as the process variables to be controlled. A Forced Air Cooler 38-610 is also available. It accelerates the process dynamics using a constant input temperature, allowing a high temperature differential to be monitored for longer periods.

Meanwhile, for other equipment, the details are summarized in the following table:

No	Equipment	Function
1	Muffle Furnace	For ashing and sample pre-treatment
2	Water Purification System	To produce Type 1 water to be used in analytical equipment
3	Autoclave (upright)	For sterilizing purposes
4	Grinder	For grinding and crushing fibrous material and brittle, hard material.
5	Hot Press Machine	For molding of various polymetric materials.
6	Spectrophotometer	An analytical equipment to measure transmittance of a sample in UV and visible region
7	TOC Analyzer	An analytical equipment to analyze Total Carbon (TC), Inorganic Carbon (IC), Total Organic Carbon (TC-IC) and Non-purgeable organic carbon (NPOC)
8	Hydrothermal Pretreatment (Acid Hydrolysis) Reactor	For pretreatment and conversion of lignocellulosic materials (biomass) to obtain hemicelluloses, cellulose and lignin by subjecting the materials continuous hydrothermal pre-treatment at relatively high temperature and pressure

Faculty of Engineering Seminar Series

The Faculty of Engineering is actively involved in holding seminar series which showcase the research work conducted by members of the faculty throughout the year. The seminar series held this year includes:

1. Development of Brain Computer Interface (BCI) Software for Electroencephalography (E.E.G) by Mr Mohd Faizriwan Mohd Sabri on 30 January 2013
2. Mobility Management for Carrier Aggregation in Lite-Advanced System by Mdm Ade Syaheda Wani Marzuki on 13 February 2013
3. Engineering Value by Assoc. Prof. Dr Nasser Rostam Afshar on 6 March 2013
4. Proposed Field Scale Photocatalytic Reactor for In-situ Groundwater Remediation by Dr Leonard Lim Lik Pueh on 15 May 2013
5. The Mechanical Properties of Recyclable Hemp-based Fibre Composite by Dr Nicholas Kuan Hoo Tien on 7 August 2013
6. Estimating Parking Pricing Model in Modifying Travellers' Behaviour by Dr Mohamad Raduan Kabit on 8 Nobember 2013
7. The Mechanical Properties of Recyclable Hemp-Based Fibre Composites by Dr Siti Kudnie Sahari on 20 November 2013
8. MULTIPHASE FLOW SYSTEMS: Historical Context and Current Implications and Trends by Assoc. Prof. Dr. Khairuddin Sanaullah on 28 November 2013
9. Bamboo Fiber Polypropylene Composites: Effect of Fiber Treatment and Nano Clay on Mechanical and Thermal Properties by Dr. Md Rezaur Rahman on 11 December 2013

Collaboration with other Universities/Organizations

The collaborations between UNIMAS with other university or private sector are summarized in the following table:

Opening Ceremony by Vice Chancellor of UNIMAS: Memorandum of Understanding between UNIMAS and Golden Circle Venture Sdn Bhd

Photo Session: Memorandum of Understanding between UNIMAS and Golden Circle Venture Sdn Bhd

No.	MOU/MOA Name	Date
1.	Memorandum of Understanding (MoU) Signing Ceremony between UNIMAS and Yamaguchi University, Japan	29 March 2012
2.	Memorandum of Understanding (MoU) Signing Ceremony between UNIMAS and Tokuyama Corporation, Japan	29 March 2012
3.	Memorandum of Understanding (MoU) between UNIMAS and KeTTHA (Kementerian Tenaga, Teknologi Hijau dan Air)	1 May 2013
4.	Memorandum of Understanding (MoU) between UNIMAS and UNITEN	2 July 2013
5.	Memorandum of Agreement between UNIMAS and Limoges University, France	2 July 2013
6.	Memorandum of Agreement between UNIMAS and Dermaga Builders Sdn Bhd	2 July 2013
7.	Memorandum of Understanding between UNIMAS and Golden Circle Venture Sdn Bhd	10 October 2013

Students' Best Papers

Tsukamoto Fuzzy Model with Harmony Search for Predicting High Strength Concrete Compressive Strength

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Abstract

Compressive Strength is one of the most important requirements to be achieved in high strength concrete mixing. Since there is no specific guide on mix proportion of high strength concrete, there is a need to develop a model which can predict compressive strength from a given concrete mix composition, in order to minimize the number of trial and error of mixing before getting the desired compressive strength. In this study, a Tsukamoto Fuzzy Model with Harmony Search is developed to predict compressive strength of high strength concrete. A dataset of laboratory work is obtained from literature review, and were used in training and testing of the model. Fuzzy parameters were determined with Harmony Search, and used to predict compressive strength of a given high strength concrete mix composition. Predicted values from the model were compared with experimental values. This paper reports preliminary results from analysis, which shows that Tsukamoto Fuzzy model is potential of giving good predictions of compressive strength for high strength concrete.

Keywords: Fly ash, high strength concrete, mixing, compressive strength, prediction.

No.	Target output (MPa)	Output by model (MPa)	Absolute error	Relative error (%)
1	79.86	86.8	-6.94	-8.00
2	77.73	86	-8.27	-9.62
3	91.2	85.4	5.8	6.79
4	90.28	84.3	5.98	7.09
5	78.23	72.06	6.17	8.56
6	79.86	86.8	-6.94	-8.00
7	77.95	86	-8.05	-9.36
8	90.39	91	-0.61	-0.67
9	77.81	89.8	-11.99	-13.35
10	97.51	105.8	-8.29	-7.84

Sound Absorption Property of Agricultural Lignocellulosic Residue Fibre Reinforced Polymer Matrix Composite

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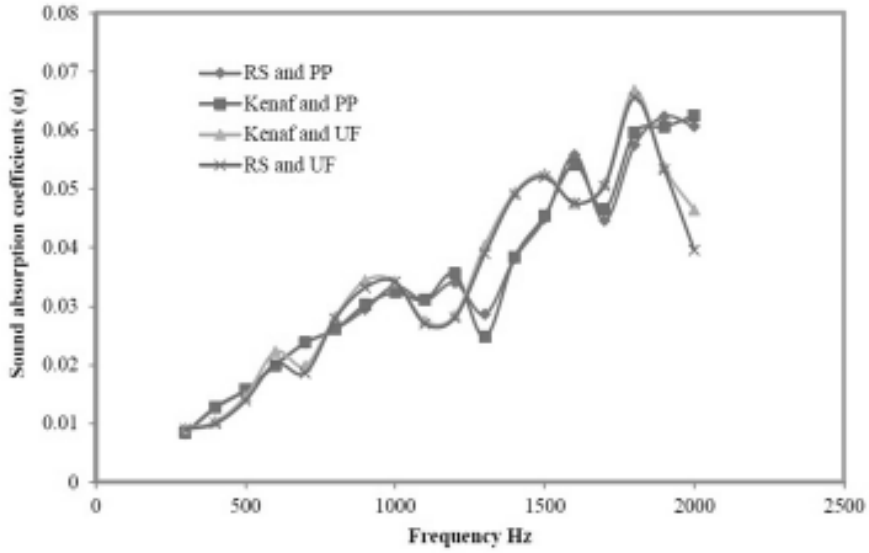
Abstract

In this research, the sound absorption coefficients of polymer matrix reinforced lignocellulosic fiber composites were investigated. Its sound absorbing characteristic was investigated in the impedance tube, according to transfer function method. A two microphone setup was fabricated according to American society for testing materials ASTM E1050 – 10 and it is used to measure sound absorption coefficients of composites. In this investigation, the influences of two kinds of polymer matrix (Polypropylene and Urea-formaldehyde) and two kinds of natural fibers (rice straw and kenaf) were studied for sound absorption. Four samples of novel sound absorbers were made with

different matrix and fibers composition, Sample 1 and 2 was made of rice straw reinforced with polypropylene and Urea-formaldehyde and Sample 3 and 4 was made with kenaf fiber reinforced with polypropylene and Urea-formaldehyde matrix. Sound absorption coefficients were measured at frequencies from 300 Hz to 2000 Hz. The results showed sound absorption increased with frequencies until it reached a frequency of 2000 Hz. At 1200 Hz sound absorption decreased for all the samples which is due to specific character of natural fibers. From the result, the type of natural fiber did not have significant influences on sound absorption coefficients. It was found that the matrix influence more in sound absorption properties in low frequencies; and due to the fact that above composites are low sound absorbing materials; but still they are better than other construction materials available in sound absorbing properties.

Keywords: Natural fibers, Sound absorption coefficient, Impedance tube, Composites



Comparison of sound absorption coefficients of four types of composites

The Effects of Elevated Temperatures on Concrete Containing Agricultural Waste Palm Oil Fuel Ash (POFA) as Cement Replacement

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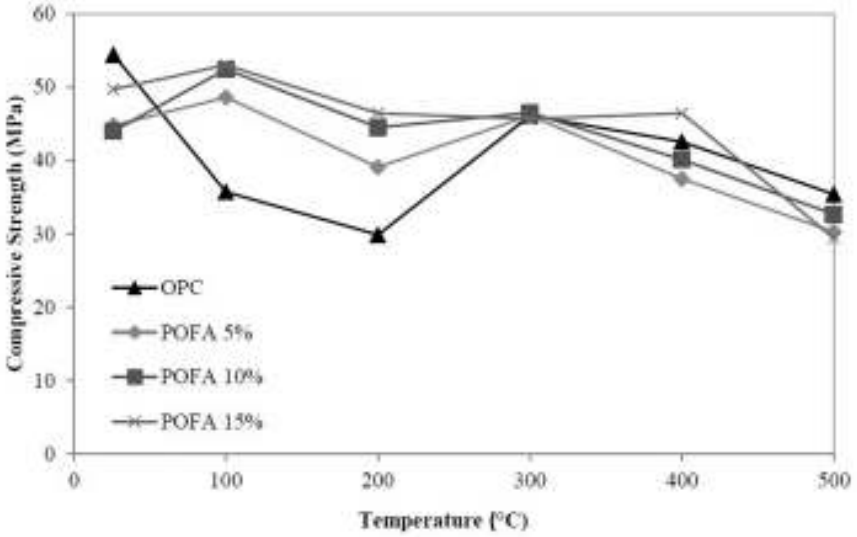
Abstract

Palm oil fuel ash (POFA) is a waste ash generated abundantly from the oil palm industries and it is disposed as landfill without any commercial return. In recent years, studies found that POFA can actually be used as cement replacement material due to its pozzolanic characteristics. In this study, POFA was used to replace ordinary Portland cement (OPC) at 5%, 10% and 15% by weight of binder to cast concrete. An investigation on the effects of elevated temperatures on both OPC and POFA concretes namely crack development, mass loss and compressive strength was conducted. The results showed that the formation of hair-lines cracks on the surface of concrete occurred at temperatures 400 ˚C and 500 ˚C. Besides that, all concretes were found to experience mass loss after being exposed to elevated temperatures. In terms of compressive strength, all POFA concretes except control OPC concretes showed increase in compressive strength after been heated to temperature 100 ˚C. At elevated temperature of 500 ˚C, all concretes experienced decrease in compressive strength.

Keywords: Palm oil fuel ash, elevated temperature, mass loss, crack development, compressive strength



Effect of Elevated Temperature on Compressive Strength of Concrete

Thermal Performance of Low-Cost House with Retrofit Solutions

[1]J. Y. E. Tin, W. A. W. Z. Abidin, A. Baharun and T. Masri
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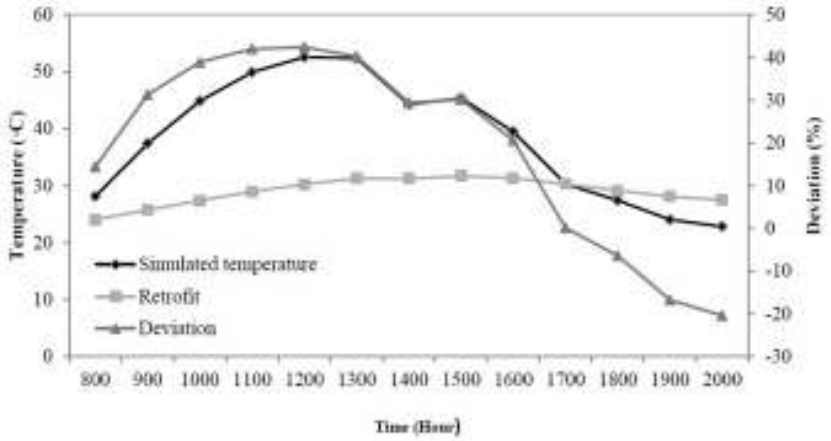
Abstract

Cooling systems play an important role to maintain the desired comfort level of indoor environment. Passive cooling system is one of the cooling techniques which are widely used in housing and building development. It includes the application of natural processes and passive technologies to remove heat without the usage of conventional cooling system. Passive technologies involve different building envelope designs in reducing the heat absorption and heat conduction of the buildings. For country like Malaysia, cooling is always an issue since its climate is hot and humid. The condition of low-cost houses is a concern as the constructions of these buildings mostly do not consider the thermal comfort within the house. This research is aimed to present the thermal performance of a selected low cost house in Samariang, Kuching. The performances of the low cost house are evaluated by the experimental data collected and also the simulated results from a software called EnergyPlus. Retrofit solutions which involve passive cooling techniques are done in simulation method to improve the comfortable level within the house. The concept of radiant cooling is applied by installing insulation layer in roof and ceiling. The insulation layer is effective in repelling heat but shows negative impazact at night as it will store the heat within the house. Figure 1 below shows the simulated, retrofit and deviation results obtained from the study.

Keywords: cooling systems, passive cooling, building envelope, low-cost houses, EnergyPlus



Comparison between simulated, retrofit and deviation value

An Index-Based Monotonicity Preserving SIRMs-Connected Fuzzy Inference System

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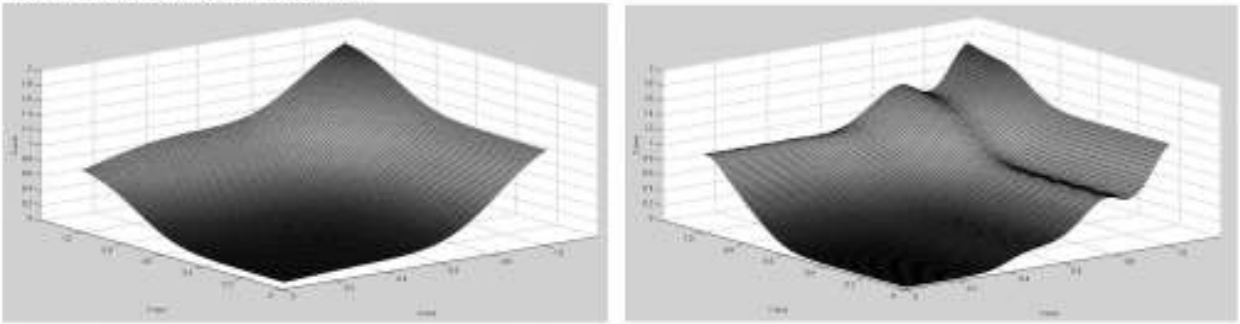
Abstract

This paper presents an index-based monotonicity-preserving data-driven single input rule modules (SIRMs)-connected fuzzy inference system (FIS) model. The proposed model allows an SIRMs-connected FIS model to be constructed based on input-output pairs of data, where the monotonicity property is exploited as an additional qualitative information to obtain a meaningful FIS model. The data-driven monotonicity preserving FIS model is formulated as a constrained optimization problem. In this study, harmony search (HS) is used to search for an SIRMs-connected FIS which best fits a set of data. A proposed monotonicity index (MI) is then used as an approximate indication whether the SIRMs-connected FIS model has fulfilled the monotonicity property. The proposed data-driven SIRMs-connected FIS model is then verified with a simulated data set.

Keywords: data-driven modelling, harmony search, monotonicity index, single input rule modules (SIRMs), system identification



Noisy data tested (a) with MI and (b) without MI as constraint

Student News

1st Faculty of Engineering Postgraduate Colloquium (FEPC) 2013

By: Florence Francis Lothai & Lau See Hung

1st Faculty of Engineering Postgraduate Colloquium (FEPC 2013) was held in the Faculty of Engineering on the 17th April 2013 from 8:30am – 5:00pm organized by the Postgraduate Student Association (POSA). The theme for FEPC 2013 is "Recent Research Trend in Engineering." The purpose of the Engineering Colloquium is (1) to provide a platform for postgraduate students to present the progress of their work and (2) obtain constructive feedbacks and comments by engaging themselves in stimulating dialogues. This colloquium aims (1) to build the confidence in postgraduate students and (2) to enhance the postgraduate students' presentation skills in preparation to VIVA VOCE at the end of their studies.

The topics for FEPC 2013 include; (1) Composite Materials; (2) Environment, Waste Water Management and Geotechnical; (3) Green Technology; (4) Engineering Management; (5) Modeling and Simulations; (6) Soft Computing and Application and (7) System Design and Engineering.

There are 41 postgraduate students shared on their findings where Mr Elammaran Jayamani, Miss Chiew Fei Ha and Miss Lau See Hung emerge as the winners for the best paper awards.

(L)Dr Hushairi Zen (Deputy Dean - Postgraduate and Research) presenting a token of appreciation to Prof Dr Wan Hashim Wan Ibrahim, (Dean of Faculty of Engineering). (R) Prof Dr Wan Hashim Wan Ibrahim delivering his speech during the opening ceremony

Questions and Answer session for Environment, Waste Water Management and Geotechnical

Presenter for System Design and Engineering, Mr John Tin Yuan En on his paper with the title "Cooling System Design Technologies in Buildings".

Presenter for Theme Green Technology, Miss Thong Chia Chia on her paper with the title "A review on the use of solid waste materials as coarse lightweight aggregate in concrete".

Best paper awardee, Mdm Chiew Fei Ha with her paper with the title "Tsukamoto Fuzzy Model with Harmony Search for Predicting High Strength Concrete Compressive Strength".

Research Students

Civil Engineering

Name	Level	Type	Supervisor	Co-supervisor(s)	Title
Nur Afnie Faryisha binti Mohamad Hamzah	Master	Full Time	Rosmina binti Ahmad Bustami	Prof Dr Salim bin Said	Design of Long Storage for Excess Water and Development of Hydrological Framework in Sungai Sarawak Kanan Sub-Basin
Joan Dolly Chung Zie Wei	PhD	Full Time	Prof Ir Dr Law Puong Ling	Prof Dr FJ Putuhena	Trickling Filter for Domestic Wastewaters
Tay Chiaw Teck	Master	Part Time	Prof Dr Wan Hashim bin Wan Ibrahim	-	Analyzing Two-Way Two-Lane Highways Based on Malaysian Road Condition
Zamhuri Drahman	Master	Part Time	Prof Dr Wan Hashim bin Wan Ibrahim	-	Malaysia Airports Pavement Management System
Oon Yin Wee	PhD	Full Time	Prof Ir Dr Law Puong Ling	Dr Lim Soh Fong / Prof Dr Kopli Bujang	A Novel Oil and Grease (O&G) Removal Apparatus with Curved Coalescence Frustums and Triangular Surface Restraints
Chong Kok Hing	PhD	Full Time	Prof Ir Dr Law Puong Ling	Prof Ir Dr Andrew Ragai Henry Rigit / Dr Rubiyah binti Haji Baini	Biomass-to-Heat Energy Converter for Drying Purpose in the Production of Paper Egg Trays
Quay Wei Kwang	Master	Full Time	Ir Ting Sim Nee	Prof Ir Dr Law Puong Ling	Amelioration of Occupational Safety and Health (OSH) Practices in Malaysia
Norsuzailina binti Mohamed Sutan	PhD	Part Time	Prof Dr Sinin Hamdan	Prof Madya Dr Azhaili bin Baharun	Effects of Modified Cement Systems on Efflorescence
Freddy Kho Wee Liang	PhD	Full Time	Prof Ir Dr Law Puong Ling	Prof Ir Dr Andrew Ragai Henry Rigit	Carbon Monoxide Levels Along Roadway
Wennie Blantaw anak Enggu	Master	Part Time	Prof Dr Wan Hashim bin Wan Ibrahim	-	Investigating the Performance of Signalized Intersection Along an Arterial Road in Sibu
Franklin Simon	Master	Full Time	Ron Aldrino Chan @ Ron Buking	Ir Ting Sim Nee / Dr Tay Kai Meng	The Use of Fuzzy Inference System for Risk Assessment and Decision Making for Sarawak River Transport
Arkin Kong Chung King	PhD	Full Time	Prof Madya Dr Azhaili bin Baharun	Ir Ting Sim Nee	An In Depth Study on Supply Chain Management (SCM) in the Construction Industry in Sarawak
Lau See Hung	PhD	Full Time	Prof Dr Ng Chee Khoon	Dr Tay Kai Meng	Development of a Data Driven Fuzzy System for Evaluating Ultimate Tendon Stress and Flexural Strength of Externally Prestressed Beams
Chiew Fei Ha	PhD	Full Time	Prof Dr Ng Chee Khoon	Dr Tay Kai Meng	Optimization of Mix Proportion for High Strength Concrete Based on Harmony Search
Sim Yeong Liang	PhD	Full Time	Prof Dr FJ Putuhena	Prof Madya Dr Azhaili Baharun / Prof Ir Dr Law Puong Ling	Development of Construction Quality Assessment Model that Applicable to Malaysian Construction Industry

Aliyu Haliru Hong	PhD	Full Time	Prof Ir Dr Law Puong Ling	Dr Onni Suhaiza Selaman	Wastewater Reuse and Its Health Implication on Irrigated Vegetable at Lake Geriyo Irrigation Project, Yola, Adamawa Estate, Nigeria
Mohammad Fadzli bin Jawawi	Master	Part Time	Prof Madya Dr Siti Noor Linda Taib	-	Stabilization of Peat Soil Using Fly Ash and Sago Ash at Kampung Sau, Mukah
Lee Lin Jye	PhD	Full Time	Prof Dr Shenbaga Kaniraj Rajaratnam	Prof Madya Dr Siti Noor Linda Haji Taib	Analyse the Lateral Movement on Soft Riverbank
Muhammad Abdul Syahid bin Saari	Master	Full Time	Prof Madya Dr Mohd Ibrahim Safawi Mohd Zain	-	The Roles of Constituent in Achieving Self-Compactibility Criteria for Self-Compacting Concrete
Eric Yong Pik Kwong	Master	Full Time	Dr Delsye Teo Ching Lee	Norsuzailina Mohamed Sutan	The Engineering Properties of Concrete Containing Waste From the Oil Palm Industry
Thong Chia Chia	Master	Full Time	Dr Delsye Teo Ching Lee	Prof Dr Ng Chee Khoon	Structural and Durability Properties of Concrete with Polyvinyl Alcohol (PVA) Coated Oil Palm Shell (OPS) as Lighweight Aggregates Under Different Curing Conditions
Nafisa Tamanna	Master	Full Time	Norsuzailina Mohamed Sutan	Dr Delsye Teo Ching Lee / Ibrahim Yakub	Parametric Study on Utilizing Waste Glass as a Finely Ground Mineral Additive (FGMA) in a Modified Multi-Component Binder (MMCB) Durable Eco-Friendly Cement System
Ong Chet Yun	Master	Full Time	Prof Dr F J Putuhena	Dr Darrien Mah Yau Seng	Application of Mdelling Technique to Study the Effectiveness of Sustainable Stormwater Management System (Case Study): Sungai Maong Urban Area
Striprabu a/l Strimari	PhD	Full Time	Prof Madya Dr Siti Noor Linda Haji Taib	Dr Norazzlina M. Sa'don	Chemical Stabilization of Sarawak Soils as Pavement Subbase
Yong Leong Kong	PhD	Full Time	Prof Ir Dr Law Puong Ling	Prof Madya Dr Siti Noor Linda Haji Taib / Dr Darrien Mah Yau Seng	Model Development of Riverbank Erosion at Batang Rejang
Riji Burmanu Benjamin	PhD	Full Time	Prof Ir Dr Law Puong Ling	-	Modelling of Environmental Pollution from Decayed Vegetables in the Face of Climate Change in Northeast Nigeria

Electrical and Electronics Engineering

Name	Level	Type	Supervisor	Co-Supervisor(s)	Title
Sharifah Fatimah binti Tuanku Abdullah	Master	Part Time	Sakena binti Abdul Jabar	Nurdiani binti Zamhari	Fiber to the Home Based Over WDM for Dynamic Bandwidth in The Malaysian Environment
Patrick Teo Tien	Master	Part Time	Ir David Bong Boon Liang	Annie ak Joseph	Analysis and Modeling of Technical Losses in Distribution Networks

Gabriel anak Jatu	Master	Part Time	Dr Hushairi Zen	Prof Ir Dr Andrew Ragai Henry Rigit	Design and Implementation of Micro-Hydropower System for a Stand-Alone Rural Village Electrification
Saleem Ahmad Saleem Jayousi	PhD	Full Time	Prof Madya Dr Mohd. Saufee bin Muhammad	-	Computerized Maintenance for Electronic Instrument
Jee Tze Ling	PhD	Full Time	Dr Tay Kai Meng	-	A New Two-Stage Framework with Generic Algorithm Search and Similarity Reasoning for Constructing Fuzzy Interference Models with Real World Applications
Azzyati binti Basrol	Master	Full Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Dr Kismet Hong Ping	L-Band Mobile Satellite Signal Performance Using Handheld GPS Receiver on Building Effects
Michelle Lu	Master	Full Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Kasumawati binti Lias	The Modernization of the Transmission Grid: Smart Grid
Elizabeth Kho Ching Tee	PhD	Part Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Ng Liang Yew / Dr Alexander Hoelke	Design of Super Junction Devices
Chai Nee Ping	PhD	Full Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Prof Madya Dr Al-Khalid Haji Othman / Dr Hushairi Zen	Real-Time Heavy Vehicle Monitoring using GPS and GIS Technology
John Tin Yuan En	PhD	Full Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Prof Madya Dr Azhaili bin Baharun / Prof Madya Dr Al-Khalid Haji Othman	Adaptive Solar Energy System for Low-Cost Home Cooling System
Ng Liang Yew	PhD	Part Time	Dr Hushairi Zen	Prof Madya Dr Al-Khalid Haji Othman	Tracking with Non-Line-of-Sight (Nlos) Mitigation in Indoor Environment
Jong Chian Haur	Master	Full Time	Dr Tay Kai Meng	-	Development of a Single-Input-Rule-Module Fuzzy Inference System-Based Failures Prioritization Technique for Edible-Bird's Nest Processing
Marta a/p Elizabeth	Master	Full Time	Dr Kismet Hong Ping	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin / Dr Nordiana Rajaee	Time-Domain Inverse Scattering Technique for Early Breast Cancer Detection
Chai Kok Chin	PhD	Full Time	Dr Tay Kai Meng	-	Development of Type 2 Fuzzy Logic Based Decision Making Support Model/Software Prototype for the Application in Local (Sarawak) Industries
Chang Wui Lee	Master	Full Time	Dr Tay Kai Meng	-	Development of an Evolving Fuzzy Rule-Based System for Object Detection in Video

Puteh Munawwarah binti Ibrahim	Master	Full Time	Dr Kismet Hong Ping	Dr Nordiana Rajaee / En Martin Anyi	Reconstruction of Breast Composition Utilizing Filtered Forward-Backward Time-Stepping (FBTS) Inverse Scattering Technique
Faisal Rehman	Master	Full Time	Dr Hushairi Haji Zen	Prof Madya Dr Azhaili Baharun / Dr Kismet Hong Ping	Integration of Power System Through Smart Grid
Kang Chia Yang	Master	Part Time	Dr Hushairi Haji Zen	Prof Madya Dr Al-Khalid Haji Othman / Hazrul Mohamed Basri	Cause and Effect of Low Power Quality in Homes and Industries in Sarawak
Yong Guang	PhD	Full Time	Dr Kismet Hong Ping	Prof Madya Dr Al-Khalid Haji Othman / Dr Thelaha Haji Masri	Filtered Forward-Backward Time-Stepping Inverse Scattering Technique for Buried Object Detection and Shape Reconstruction
Ng Shi Wei	PhD	Full Time	Dr Kismet Hong Ping	Dr Hushairi Haji Zen / Prof Madya Dr Wan Azlan Wan Zainal Abidin	Microwave Imaging Reconstruction of Breast Composition Utilizing Filtered Forward-Backward Time-Stepping Technique for Breast Cancer Detection
Andrew Sia Siew Chie	PhD	Full Time	Dr Kismet Hong Ping	Dr Nordiana Rajaee	Detection of Buried Objects in Dispersive Medium Utilizing Filtered Forward-Backward Time-Stepping Inverse Scattering Techniques
Therry Lee Zee	Master	Full Time	Ir David Bong Boon Liang		Multimodal Biometric Recognition Based on Bil-Plane Extraction
Nurliyana binti Hussaini	Master	Full Time	Dr Thelaha Haji Masri	Prof Madya Dr Wan Azlan Wan Zainal Abidin / Dr Kismet Hong Ping	Performance Enhancement of Microstrip Antennas Using Electromagnetic Band Gap Structures
Florence Francis Lothai	Master	Full Time	Ir David Bong Boon Liang		An Analysis of the Effects of using Various Sensors in Biometric Identification
Kueh Yi Lin	Master	Part Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Dr Thelaha Masri / Dr Kismet Hong Ping	Real-time Image Processing for Vehicle Collision Prevention and Mitigation System
Nuramalina binti Bohari	Master	Full Time	Prof Madya Dr Wan Azlan bin Wan Zainal Abidin	Martin Anyi / Dayang Nur Salmi Dharmiza binti Awang Salleh	Solar-hydro Hybrid Controller System Design
Muhammad Sheraz	PhD	Full Time	Dr Hushairi Zen	Prof Madya Dr Al-Khalid Haji Othman	Optimizing Routing Protocol in Wireless Sensor Networks
Bello Olalekan	PhD	Full Time	Dr Hushairi Zen	Prof Madya Dr Al-Khalid Othman	Scheduling in Satellite Networks Employing Mimo Technology
Toh Sheng Wei	PhD	Full Time	Dr Tay Kai Meng	Prof Madya Dr Mohamad Omar Abdullah	Intelligent Performance Optimization Framework for Collaborative Hybrid Energy System
Pang Lie Ming	PhD	Full Time	Dr Tay Kai Meng	Dr Darrien Mah Yau Seng	A New Type-2 Single Input Rule Modules (Sirims) Connected Fuzzy Interference System-based Group Decision Support and Assessment System with Engineering Applications

Mechanical and Manufacturing Engineering

Name	Level	Type	Supervisor	Co-Supervisor(s)	Title
Peter Yek Nai Yuh	Master	Full Time	Prof Madya Dr Haji Mohd. Omar bin Abdullah	Ervina binti Junaidi	Computer Simulation Analysis for Statics Stability of Airboat in Sarawak Riverine Application
Cheong Yaw Hong	Master	Part Time	Prof Ir Dr Andrew Ragai Henry Rigit	-	Harnessing Tidal Energy for Electricity Generation at Sejingkat, Kuching, Sarawak
Tian Chuan Min	Master	Full Time	Prof Madya Dr Haji Mohd. Omar bin Abdullah	Prof Madya Dr Abu Saleh Ahmed	Custom Design, Development and Techno-Economical Study of a Small Cooling Water Power Generator for Sejingkat Power Corporate Sdn. Bhd
Md. Nurul Hoque	PhD	Full Time	Prof Dr Sinin bin Hamdan	-	Studies on Polypropylene Composite Reinforced with Chemically Modified Sawdust
Siti Mas Arena Liakbar	Master	Full Time	Prof Madya Dr M. Shahidul Islam	-	Optimization of Energy Transmission System on In-Stream Micro Hydro Turbine
Tracy anak Dickie	PhD	Part Time	Prof Madya Ir Dr Mohd. Shahril bin Osman	Mahshuri Yusof	Fabrication and Mechanical Measurement of Nipah Palm Fiber Material
Harunal Rejan bin Ramji	Master	Full Time	Prof Madya Dr Haji Mohd. Omar Abdullah	-	Study of Heat-Driven Adsorption Air-Conditioning System Using Biomass-Based Activated Carbon-Mehanol for Vehicle Application
Alan Bong Kim Ming	Master	Part Time	Prof Madya Ir Dr Mohd. Shahril bin Osman	-	Evaluation of a Modified Conversion of a Pump as Turbine
Teo Chong Yaw	Master	Full Time	Dr Abdullah bin Haji Yassin	-	Temperature Measurement of High Speed Milling
Christopher Jantai anak Boniface	Master	Full Time	Prof Madya Ir Dr Mohd. Shahril bin Osman	-	A Radiant Times Series Method for Cooling Load Calculation for Dewan Tunku Abdul Rahman (DeTAR PUTRA UNIMAS)
Patrick Low Tiong Kie	PhD	Part Time	Prof Ir Dr Andrew Ragai Henry Rigit	-	A Thermal Conversion System for Converting Oil Palm Fronds into Biochar for Oil Palm Plantation
Elammaran Jayamani	PhD	Part Time	Prof Dr Sinin Hamdan	Prof Madya Dr Abu Saleh Ahmed / Prof Madya Dr Saad A. Mutasher (Swinburne)	Absorption and Impedance Measurements of Lignocellulosic Particle Composite for Sound Absorbing Wooden Construction Materials

Kiew Kwong Siong	Master	Full Time	Prof Dr Sinin Hamdan	Dr Md Rezaur Rahman / Prof Madya Dr Saad A. Mutasher (Swinburne)	An Investigation of Dielectrical and Thermal Properties of Chicken Feather Unsaturated Polyester Composites
Taharah binti Edin	Master	Full Time	Prof Madya Dr Abu Saleh Ahmed	Dr Md Rezaur Rahman	Biodiesel Production from Jatropha Oil as an Alternative Fuel for Diesel Engine
Md Faruk Hossen	PhD	Full Time	Prof Dr Sinin Hamdan	Dr Md Rezaur Rahman	Crystal Structures and Growth Mechanisms of Nanoparticles Prepared by Polyol Method with Different Couples of Metal
Hazel Maybelline anak Johan	Master	Full Time	Dr Syed Tarmizi Syed Shazali	Dr Abdullah Yassin	Effects of Automated Manufacturing System Toward Workforce's Behaviours
Ting Ching Hung	Master	Full Time	Prof Madya Dr M. Shahidul Islam	Dr Syed Tarmizi Syed Shazali / Dr Abdullah Yassin	An Approach with Operation Research for Developing Predictive Model for Industrial Preventive Maintenance
Yiong Ngee Fei	Master	Full Time	Prof Dr Amir Azam Khan	Dr Nicholas Kuan Hoo Tien	The Effect of Particle / Fibre Addition to Polymer Matrix Composites: Study of Vibration and Acoustic Properties
Syed Salman Shafqat	PhD	Full Time	Prof Dr Amir Azam Khan	Dr Shanti Faridah Salleh / Dr Nicholas Kuan Hoo Tien	Sol-gel Synthesis of Copper and Nickel Nanoparticles by Using Organometallic Precursors
Houssein M. A. Elaswad	PhD	Full Time	Prof Madya Dr M. Shahidul Islam	Dr Abdullah Yassin / Dr Syed Tarmizi Syed Shazali	Measirong Contextual Effect of Inputs on Physical amd Economic Efficiency of Production
Dayang Salyani binti Abang Mahmod	PhD	Full Time	Prof Dr Amir Azam Khan	Dr Magdalene Andrew Munot	Low Temperature Solid Oxide Fuel Cells: Synthesis, Assembly and Testing at Temperatures Below 600K

Chemical Engineering and Energy Sustainability

Name	Level	Type	Supervisor	Co-Supervisor(s)	Title
Nazeri Abd Rahman	PhD	Part Time	Dr Rubiyah binti Haji Baini	Prof Madya Dr Haji Mohd. Omar bin Abdullah	Sustainable Utilisation of Pelletised Plantation Biomass Wastes in Sarawak for Power Generation
Jong Yik Jia	Master	Full Time	Prof Madya Dr Haji Mohd. Omar bin Abdullah	-	Energy Performance Study of A Chip Fryer
Norliana Anis Izzati binti Zakaria	Master	Full Time	Prof Madya Dr Haji Mohd. Omar bin Abdullah	Nur Syuhada binti Ahmad Zauzi	Biodiesel Production from Conventional and Microwave Assisted KOH Catalyzed Transesterification of Waste Frying Oils
Wong Teck Soon	PhD	Full Time	Dr Shanti Faridah Salleh	Dr Lim Soh Fong	Assessment of the Availability of Agricultural Waste for Energy Production
Siti Kartina Abdul Karim	PhD	Part Time	Dr Lim Soh Fong	Prof Ir Dr Law Puong Ling / Dr Shanti Faridah Salleh	Green Materials for Water Treatment Process
Afrasyab Khan	PhD	Full Time	Prof Madya Dr Khairuddin Sanaullah	Dr Hushairi Zen / Dr Lim Soh Fong /Prof Mohd Sobri Takriff (UKM)	Super-sonic Gases Direct Contact Mixing and Condensation Study

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